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The Journal of the Child-Study Society.

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The object of the Society is the Scientific Study of the Mental and Physical Condition of Children, and also of Educational Methods, with a view to gaining greater insight into Child-nature and securing more sympathetic and scientific methods of training the young.

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LIST OF CONTENTS.

PAGE

Adolescence. By Sir THOMAS CLOUSTON, M.D., LL.D.... ... 1, 90

Adolescent Girls from the View-point of the Physician. By MARY A. D. SCHARLIEB, M.D., M.S. 8

Alfred Binet (1857–1911). By Prof. E. CLAPARÈDE. Translated by MARY LOUCH 18, 97

Measurement in Child Study. By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S. 33, 73, 113

The Influence of Defects of Hearing in Relation to the Mental and Physical Development of the Child. By J. KERR LOVE, M.D. 42

The Influence of Defects of Vision in Relation to the Mental and Physical Development of the Child. By N. BISHOP HARMAN, M.A., M.B., F.R.C.S. 48

The Instruction of the Young in Sexual Hygiene. By ERIC PRITCHARD, M.A., M.D. 54

How a Teacher can Test the Value of his own Methods: a Research in Experimental Pedagogy. By W. H. WINCH, M.A. 60

Mental Hygiene in Relation to the Development of the Child. By THEO. B. HYSLOP, M.D., F.R.S.E. 78

The Experimental Study of Memory. By BEATRICE EDGELL, M.A., PH.D. 84, 118

Observations on the Development of the Colour Sense. By Dr. O. DECROLY and MLLE. DEGARD. Translated by T. G. TIBBEY, B.A. 103

The Tuberculous Child. By JANE WALKER, M.D., L.R.C.P.I., L.R.C.S. 126

Suggestions for Parents and Teachers—

The Cultivation of Respect 25
The Order of Speech Development 25
Formal Training 26

PAGE

Dangers in Choosing a Trade 26
Stages of Development 67
The Constructive Instinct 67
How to Study Infants 67
The Essentials of a Good Experiment 68
Experimental Work and Training Colleges 68
A Scientific Form of Questionnaire 68
Mental Heredity 108
The Importance of Sleep 108
Physiological Education 109
Sensory Training 138
Teaching the Domestic Arts 138
Parental Pedagogy 139

Notes 27, 69, 109, 140

Correspondence—Co-Education. Sexual Hygiene ... 28, 141

Reviews of Books, etc.—

L'Educateur Moderne 30, 31, 111
Bulletin de L'Education Morale de la Jeunesse 30, 32
The School, an Introduction to Education. By Prof. J. J. Findlay, M.A. 30
School Visits and Journeys, their Value and their Practice in Education. By Horace Piggott, M.A., Ph.D. 31
La Revue Psychologique 31, 111
Archives de Psychologie 32, 111
Toys and Toymaking. By G. F. Johnson 72
The Gateways of Knowledge. By J. A. Dell, M.Sc. 72
An Introduction to the Study of Adolescent Education. By C. B. Andrews 110
Essays on Duty and Discipline 110
Our Children's Health at Home and at School. Edited by C. E. Hecht, M.A. 111
Introduction to Experimental Education. By R. R. Rusk, M.A., Ph.D. 111
L'Education Familiale 111
The Sexual Life of the Child. By Albert Moll, M.D. 141
The Elements of Child Protection. By Dr. Sigmund Engel. Translated by Dr. Eden Paul 142
Citizens in the Making. By F. J. Billiarde, B.A. 143
The Diary of a Free Kindergarten. By Lileen Hardy 143
The Life of Christ. By Rev. F. M. Blakiston, M.A. 143
Builders of the Church and Prayer Book. By Miss K. L. M. Rowton ... 143
The Church's Year in the Sunday Kindergarten. By Sibyl Longman ... 143
Teachers and Taught 144

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Child-Study.

The Journal of the Child-Study Society.

ADOLESCENCE.

By Sir THOMAS CLOUSTON, M.D., LL.D.

A Paper contributed to the Halifax Child-Study Conference, July 14, 1911.

THERE are abundant physiological and psychological reasons for the division of human life into the epochal periods of childhood, adolescence, maturity, the climacteric, and old age. The period of adolescence I would fix from puberty until full maturity, *i.e.* from the age of fifteen to that of twenty-five. There are distinct differences between the growth in the bulk and weight of any organ and the development of its special function. The functional capacity, *i.e.* the output of work, cannot be estimated by mere bulk or weight. The human brain has nearly attained its full gross weight at eight years of age, but its powers of mind and its control over muscular movements are then only feeble and elementary. At eighteen it ceases to grow in bulk and weight, having only gained a fraction since the age of eight. The vital machinery of which the human brain is composed is so infinitely complicated and delicate, and the work that machinery has to do is so inconceivably subtile and important that it takes the seventeen years of life, from eight to twenty-five, to perfect it after it has almost attained its gross bulk. The last ten of those years, from fifteen to twenty-five, are the most important of the seventeen, because it is during them that all the higher bodily, mental, and moral qualities of mankind arise and grow to perfection. The second strongest instinct in nature, viz. the reproduction of the species, then comes in with all its distinctive accompaniments, physical and psychical. It is during the period of adolescence that the real evolution and education of the powers and faculties which constitute the higher life, and fit men and women for playing their part in the social, industrial, and political edifice we call "the family," "society," and "the state" take place. Any one who to-day treats the great educational

problem without regard to the evolutional and physiological knowledge of the present time will certainly miss two of its essential factors, and will be likely to come to erroneous and misleading practical conclusions. The educational problem so studied will also lose half its inherent interest. I cannot help thinking that the keenest stimulus to work of every kind lies in our getting hold of the principles that underlie all practice. Now one of the basal principles of successful education must be what our continental scientists call the "psycho-physical parallelism" between mind and brain. This means that every mental fact, and faculty, and every potentiality of acquiring knowledge necessarily imply certain physical and physiological facts and potentialities in the human brain. During the educative process the mental qualities of attention, imitation, curiosity, acquisition, memory, intelligence, sense of duty, and reasoning should in the teacher's mind be assumed to be necessarily co-related with physical, physiological and bio-chemical parallel processes going on in the brain, and when one speaks of "the brain" one means really those cells of that organ which are the vehicle of mind.

It would be easy for me to take up this whole paper on what we call the higher human brain cell, so far as we at present know it—and our knowledge of it is still most imperfect. Every year that knowledge is being added to. We do know that looking at all nature and all life the human brain cell is the most wonderful thing, because without it mind could not be apparent in this world. In a sense mind would not exist. If there is any truth in the doctrine of evolution, and few now doubt it, the brain is not only the highest thing as yet evolved, but it and its work have been the aim of all evolution from the beginning of life. It is the apex of that gigantic pyramid the base of which consists of the swarming millions of unicellular life. Not only do the capacities and functions of its cells transcend those of any other cell in nature, but their structure too is altogether unique, and unlike and beyond the structure of any other known cells.

Most forces, energies, and capacities must be studied through the physical agents or machinery by which they are produced or conditioned. On this principle the whole facts of adolescence, mental and bodily, should be studied primarily in reference to the developing brain cell. If our knowledge of this was anything like perfect evolutionally, hereditarily, and physiologically, which is far from being the case, then many of the problems of adolescence which are now obscure would become plain to us. It is manifest to the student of heredity and neurology that the brain cell, though it has infinite innate potentialities, yet is more dependent for its complete and multiform development on its

environments than anything we know in nature. Under the influence of certain environments its possessor may simply have to do the work of a day labourer. Under certain other conditions it may be called on to do the work of a statesman or a sovereign. All the complex qualities, the sum of which we include under the term "character," reside in the brain cell. The power of work, the capacity to learn, every quality that constitutes a good teacher or a good scholar must be a brain cell quality. What we call its "reactive power" distinguishes it from all other cells in the body. It reacts to, and, as it were, sympathises with, every kind of stimulus in heaven and earth. It should, if normal, have an innate sympathy with and respond to all environments, impressions, and efforts that are favourable to its development, and it should be able to resist environments and impressions that are not harmonious with or not favourable to its higher development and work.

The modern scientist holds strongly that some knowledge of physiology is essential not only to the doctor and the hygienist, but to the statesman and sociologist if the best is to be done for the right progress of mankind. If that is true, then it must be equally certain that a general knowledge of physiology and a particular knowledge of the brain cell must be necessary in the case of the teacher if he or she is to do their work efficiently. None of such higher work can be done well except the principles underlying it are understood and acted on. It makes all the difference also to the interest taken in his work, and to the mental satisfaction of doing it, whether those principles are realized.

In the development of the brain cell we have to think not only of its physiological capacities, but of its pathological risks. We want to stimulate its reactive power, but we also endeavour to avoid its becoming too "explosive." We desire to have the quality of keenness, but this must always be combined with and capable of being regulated by sufficient inhibition. A young man or woman must have enthusiasm, imagination, idealism, and an innate feeling that certain conduct and thinking and feeling are right and that others are wrong, but in all those things there must be a *via media*. There is a tendency for many brain cells during development to become over-intense in action, to lack staying power, and to lose their resistiveness against disease. Many of our social excitements, and, I believe, also some methods of teaching, are not in accordance with physiological laws, and tend towards unhealthy lives. It is not the immediate facts of the brain cell and its action we must look to, but its future condition during mature life, when its power of development has come to an end and it is doing its daily grind in the world's work.

The power of the brain cell to receive impressions from without, to store them up so that they may be able to form memories, is one of its most marvellous and as yet obscure qualities. This power is greater in adolescence than in any other period of life, in regard to certain impressions at least. The intimate structure of the cell, its molecular constitution, is altered by every sight and every sound which reach it by the eye and ear. Try to realize, if that is possible, what that means, and especially what it means in regard to the consciousness, this personality, and the life of the possessor of such a cell. Things good and bad, favourable and unfavourable, all must be received as impressions on the brain cell. They must enter into the life of the individual in some form or other. No doubt there is a filtering process which is carried out by the faculty of attention; the things we hear and see and think about, which are not attended to, are either not registered in the brain cells, or their registration is of such a faint character that they cannot be recalled in the shape of memories. The training of this faculty of attention in adolescence should be carried out on scientific principles, so that it may become acute and accurate, and that the right and favourable things should be attended to and the useless or unfavourable ones not attended to, and so left unregistered. Every brain cell is like one of the pages of a closely-printed book. It contains marks which mean ideas or information that commonly lie hidden, but may be used at any time they are wanted. The sum total of the pages—the book—is the whole brain composed of its three thousand million of cells, each of which is, as it were, crammed full of letters and words with a meaning. No human imagination is really capable of taking in the full import of the facts in regard to those brain cells, far less of anticipating the knowledge which we shall by-and-by attain about them.

We have to take into account not only the qualities of the cell structure and its protoplasm, but of the ways in which one cell is linked to another in the same group, and the ways in which different groups have direct connections with each other. Flechsig has demonstrated the method in which in early childhood the connecting apparatus between different groups of cells is formed. Strands of fibres are literally pushed through the substance of the brain so as to make those connections—the first of them being made between the centres that are of most mental importance, that is between the centres of sight and the mental centres in the fore-part of the brain. But for this process of "association" and connection the cells would be in the position of mere telephone receivers without wires to connect them with all the other telephones in the same city.

Assuming that we thus have an apparatus rightly constituted, its cells receiving impressions during the whole waking life, we have then to think of the ends and objects of this elaborate machinery. A mind-apparatus packed with memory impressions is by itself only a means to an end.

There are two great ends to be kept in view; the one is the utilization of those memories for the efficient work of life, and the other is to keep the brain-cell and the whole organism in such a state of health that it may be able to transmit its qualities, not only unimpaired, but improved to future generations. Looking over the list of brain faculties that are of most essential importance to life, no physiological psychologist can have any hesitation in selecting, not the power of reasoning, nor that of feeling, nor even that of memory, but the power of inhibition, that is, of control. Looking at life in its primordial manifestations, that is, at the uni-cellular organisms, the physiologist recognizes that a form of control is an essential part of even such a simple existence. If there were no such faculty of control, the nutrition of each such simple organism would go on and on until its size was limited simply by the nourishment it could obtain. As it is, every such cell attains only the size and the form of its ancestry, some quality of control stepping in and preventing it growing any larger. This may be called the control over nutrition which is inherent in every animal and in every organ from the lowest to the highest. Then, when we have a circulatory apparatus developed and a rhythmical muscular beat of the primitive heart, the number and the force of such beats must be regulated and controlled by some agency. When the nervous apparatus is first developed low down in the scale of life, its two great functions are, first to stimulate action, muscular and nutritive, and, secondly, to control and regulate such action. After the circulatory apparatus has developed into an elaborate system of a heart pump with four chambers, with arteries, veins, and capillaries, we find that it is provided with an elaborate nervous apparatus to quicken or slow the heart-beats, and to dilate or contract the blood-vessels. That apparatus consists of ganglia, or groups of nerve-cells, which stimulate, and ganglia which inhibit action. We can now demonstrate by experiment as well as in disease that, when the stimulating nervous ganglia are excited to undue action, the beats of the heart will rise from seventy-four per minute to twice that rate, while if the inhibitory ganglia are unduly stimulated, the heart-beats will sink to twenty per minute, or be stopped altogether. This nerve function of inhibition controls voluntary and involuntary muscle, controls nutrition, and controls the secretory functions of all glands. Many persons have no power to lay on fat or to keep up a normal bodily weight

and nutrition, and others lay on too much weight, just because the nutritional inhibitory nervous power is out of order. The whole muscular action of a living being is necessarily under the control of the motor nerves. We can, by using certain drugs, so paralyze this control that the muscles go into continuous involuntary action, and we have convulsions resulting. The disease of epilepsy is essentially one where the inhibitory nervous power over the muscles is interfered with. We have other cases where there is muscular paralysis through over-much inhibition.

Now, when we pass into the highest region of nervous action, "the highest levels of the brain," as our most distinguished fellow-countryman, Dr. Hughlings Jackson, has called them—that is, the cells which are the vehicle of the mind—and when we apply to those the knowledge of the laws of inhibition which we have acquired from a study of the muscular apparatus, we find not only that there is an inhibitory mental faculty, but that this faculty is of equal importance to the mental life and conduct of man as the cardiac inhibition is in regard to the circulation of the blood. Look, first, at mental inhibition over muscular action. In a healthy organism this should be almost absolute. A man can walk or stop walking, can play on an instrument or not play on it as he wills. In regard to sensation or feeling, the inhibitory power of the mind, which means that power of residing in the mental brain-cell, comes in everywhere. A man is hungry, that is, has a conscious feeling of a desire for food. He suddenly hears bad news, or has to act quickly, and the appetite is inhibited and felt no longer; or there is a situation of great danger with its accompaniments of intense fear and immediate call for action. In some persons this will produce a complete paralysis of feeling and action, so that there is no conscious terror and no action to avoid the danger. The same mental inhibition which stops the feeling of hunger will also stop the secretion of the digestive juices in the stomach. If food is taken under such circumstances, it will lie undigested in the stomach. Taking still higher examples of mental inhibitory power over a purely mental act, a mother loses her child, and feels such grief that she is disinclined to do the work in life that lies before her, but her other children must be cared for, her household duties must be done, or her livelihood must be earned. She inhibits the feeling of grief and goes to work to do those necessary duties. A hysterical girl, who is vain and ostentatious in disposition, sees a pearl necklace, and the desire for it inhibits her moral principle of honesty and the fear of the punishment which she knows will be inflicted on her if she steals it. The faculty of inhibition, we thus see, rises at last in mind to be the chief factor of the moral sense

and of conduct in life. Looking now at inhibition as it is developed in a human being from birth onwards, Darwin found that a child first exhibits mental inhibition at about the age of thirteen months. Previous to that no such faculty exists. From that time there is a steady progress in the development of this great faculty. Through good heredity—and the power of inhibition is a strongly hereditary quality—through teaching, through punishment, through reward, mental inhibition, the power of control, and the moral sense are slowly developed in a man or woman. It has reached a certain development in many respects at the beginning of adolescence; but yet a study of boyhood shows that it has not then arrived at such a stage that it is properly able to regulate impulse and desire, passion and temptation. A society of men and women whose power of inhibition was at the boyhood level could not hold together, and could not attain civilization. The history of humanity shows that civilization first began through the simple gregariousness of human beings. Then there was developed in each gregarious group a strong man with a powerful inhibition, who became the tyrant, the controller, and the regulator of the community. By strong measures of primitive justice, he inhibited among his subjects, theft, murder, idleness, and unsocial practices generally. Civilization really means increase of the mental inhibitory faculty as a general possession of mankind ; and this increase, to the extent which makes the higher civilized life possible, takes place during the physiological period of adolescence. Its vehicle is the brain-cell which during that period undergoes such development that control, altruism, and high motive take the place of hurtful egotistic desire, purely selfish action, and anti-social practices. The faculty is there at the beginning of adolesence, with a certain capacity of development. It is the chief duty of the teacher and the parent to stimulate and regulate that development on right lines, so that morality, duty, and the civic sense shall be universally diffused among mankind.

Adolescence has always been studied by thoughtful educationalists, and all statesmen have realized that it was the crux period of life. If any of you desire to know how it has been looked at by hundreds of thoughtful writers you will find their opinions in Stanley Hall's monumental book on "Adolescence: Its Psychology and its relation to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education." Dr. Hall's treatise is so exhaustive in its quotation from so many authors as to be almost paralysing to the reader. Being a specialist the peculiarities and abnormalities of adolescence are perhaps too strongly treated of, while its normal characteristics and its ordinary course are not sufficiently accentuated, but no one can

pretend to have thoroughly studied adolescence without reading this book.

Looking at the brain from the mere anatomical point of view, our present knowledge does not fully co-relate itself with the mental phenomena of adolescence. As we have seen, the actual bulk of the brain does not increase much from puberty to eighteen, and does not increase at all from eighteen to twenty-five. Microscopically the cell of a youth of fifteen could scarcely be distinguished from the cell of a fully developed man at five and twenty, but that results from the poverty of our present means of examination. We find throughout biology that improved and more complicated function always implies more integrated and complicated structure. It may be assumed in accordance with this law that the brain cells of a man of twenty-five are more matured, more resistive to disease, more stable, and that the communications of each cell with the other cells of its own group and of one group with another are far more precise and numerous than in a boy of fifteen. Probably the fibrils within each cell are more numerous and there is a greater difference between the larger and the smaller cells—the larger being more highly integrated. The non-medullated, fine fibres that run over the surface of the convolutions are more numerous. Those scarcely exist at birth, but soon develop in enormous numbers so as to form a most delicate envelope to the whole brain, connecting one centre with another. The actual number of cells is supposed to be the same in the brain from birth until they begin to atrophy and some of them disappear in old age, but their quality is certainly very different at five and twenty as compared with the earlier ages.

(*To be continued.*)

ADOLESCENT GIRLS FROM THE VIEW-POINT OF THE PHYSICIAN.

By MARY A. D. SCHARLIEB, M.D., M.S.

A Paper read before the Child Study Conference at Halifax, July 14, 1911.

(*Continued from page* 125, vol. iv.)

Now to come down from the sentimental and abstract to the concrete and practical. One of the first home lessons that the young people need to learn is that of punctuality. One knows that in too many

instances ablutions, devotions, and breakfast, are scamped for the sake of an extra quarter of an hour in bed, and thus the day begins badly, for the unwashed, unblessed, and unfed individual is by no means in the best frame of mind and body to commence the day's work. There is an acute dissatisfaction both of the moral and of the digestive system. And here perhaps one might mention the evils of the half-time system. In many great industrial centres a large proportion of the children divide their time between work, which is to some small extent remunerative in the present, and school, which ought to be the preparation for a far more remunerative future. The result is too often disastrous. Young girls and boys have no great capital of strength and energy; if this is expended on six hours' work there is a very small residue left for school. As a matter of statistics the half-time children have been found to be shorter, lighter, and less well developed than those not so severely tried: their nutrition is bad and their powers of endurance are small.

With regard to the school side of the problem they are seldom to be found in the standard appropriate to their age, indeed, they are stunted in mind and body, and we want another Mrs. Browning to sing again the song of the children; we want some one to awaken the conscience of the nation and to make it illegal for children and adolescents to work at anything but the preparation which might secure adequate remuneration in the future and healthy maturity. It is easy to urge that the poor father who hardly earns a living wage is most thankful for the few shillings that his children can add to the weekly store, but having admitted this, one must look with horror on the national and economic conditions that can make such a sacrifice of the innocents appear to be desirable. The stream of national life, none too vigorous, as is evidenced by our falling birth-rate, and which is sadly handicapped by the failure of many mothers to perform the maternal duty of suckling their children, is still further impoverished by this terrible overstrain which is imposed on many of our young folk.

These are some of the evil influences that militate against the welfare of children in the industrial classes. It is, however, doubtful whether the children of the rich entirely escape a danger, very different indeed in its origin, but which leads to much the same evil result. The mother who devotes to society, to a profession, or to philanthropy the time that she ought to give to her own family, is only too likely to cause a sad stunting in the nature of her young daughter. The mother, partly by her unrivalled opportunities and partly by her unique intuitions, ought to be the very best guide to her children; she ought to be their earthly Providence, the channel whereby the good gifts of food, of

warmth, of sleep, indeed of all physical blessings, are conveyed to her children.

Again, during the troublous years of adolescent life it is to the maternal instinct and ready sympathy that the sorely perplexed and harassed girl should be able to turn for guidance. If, however, that mother be too busy supplementing the father's income, immersed in society functions, or even seeking with uninstructed zeal the welfare of other people's children, home life cannot but be blighted and the children neglected to a greater or less extent. Admirable, indeed, perfectly marvellous, is the manner in which many well-born and highly-placed women fulfil their exacting functions. One needs to know quite intimately the wear and tear involved in necessary social functions in order to appreciate the labours of many women of the so-called "leisured classes"; all the same there is a time for all things, and the time when a mother has little children or young girls under her care is not the time which she should choose for devoting her best energies to work outside her family.

(*b*) *The School.*—A very important part of the environment of the young girl is her school. In the case of many children there is little choice; they have to go to the elementary or high school most conveniently situated; they have to take the education provided for them and to profit by it so far as in them lies. Therefore a fearful responsibility rests on the educational and other authorities to secure that the schools in which the great bulk of our future citizens are educated should be the best that can be provided.

To judge by the experience of other countries, notably of France, of India, and of some of our Colonies, the greatest mistake that can be made in the organization of a school is to put religious instruction outside the curriculum. Whether we be denominationalists or undenominationalists, we must all agree that the youth of our nation requires to have displayed before it day after day, year in and year out, that highest of all examples portrayed for us in the Gospels. There is no other hero so worthy of the children's devotion, there is no other example so worthy of their imitation, and there is no other example which bestows the power to imitate it.

Another essential in school life is the adaptation of the teaching to the pupils. The adolescent girl of to-day is the wife and mother of to-morrow, and according to what her future is to be must be the instruction given to her at school. Is it not possible that in too many instances the subjects taught are not those most likely to secure efficiency and happiness in the years of maturity? One desires most heartily that the children of the nation from the richest to the poorest should

have a large outlook on life, a varied mental diet, and greatly increased possibilities of that happiness that comes from adequate instruction and a well-stored memory. We should be glad to fill their minds with brave stories of the past; we should be glad to teach them how to appreciate the art and science of the present; we should like to cultivate in them an appreciation of our neighbours in the great sisterhood of nations; and, therefore, we should like them to learn the languages which would make them free of the literature and the society of France, Germany, and Italy. But after all, we cannot teach everything, and would it not be wise to limit the curriculum to those subjects which are likely to be of practical usefulness?

Elementary physiology, hygiene, and domestic science should be taught to all. A knowledge of these subjects would go far to secure that wives and mothers should know how to maintain health, should be able to appreciate the causes of disease, and should be capable and efficient housewives, able to make the utmost profit out of every sixpence.

(*c*) *The Nation.*—If the boy is father to the man, not only is the girl mother to the woman, but in a deeper and higher sense she is the fount and origin whence the nation itself springs.

With very few exceptions the women of the country bear the impress of the nurture and training they have received as young girls. During the years of adolescence the girl's nature is as wax to receive an impression, and during the course of the years which bring her to maturity her nature becomes as marble to retain.

Except under most unusual circumstances one cannot expect any real alteration of character after maturity is attained. What, then, is the responsibility of those who have to deal with the young girl at the most impressionable period of her life. We are told that "Love worketh no evil to his neighbour, therefore love is the fulfilling of the law," and undoubtedly love is the key that enables us to understand that great enigma, that most difficult of all problems, the conduct of life. Therefore, we want to teach the young girl to love her God, her country, and her fellow-men. But this love is a very different thing from the emotional and sentimental feeling that sometimes masquerades in its name. The love that is necessary to make the girl a Christian, a patriot, a good mother, and a good child, is a love which is founded on knowledge and reverence. It is therefore necessary that the growing girl should, so far as is possible, learn to know her relation to the Deity, her place as a member of that complex organism that we call the nation, and her duties in the smaller and simpler unit, which is the family. The longest of lives does not suffice to bring this knowledge to perfection.

It has been well said that "the day is short and the work is great, the reward also is great and the Master presseth; it is not incumbent on thee to finish thy work, but thou must not therefore cease from it," and so, although we shall never finish teaching, nor will the girl ever attain to an adequate appreciation of this knowledge, yet in face of much to discourage, and under the pressure of our own grievous imperfections, we must still go on and do our best to secure that the children of our day shall become wiser, stronger, and more loving than we ourselves have been.

Although at different points in this paper the question of management has already been in part considered, it would seem well in conclusion to gather together the threads, and possibly to emphasize some of the needs of young girls such as they present themselves to the consideration of doctors, educationists, and parents.

First, with regard to the one primal necessity of life—food. There is no time of life in which food is of more importance than it is to the young girl during the remarkable period of rapid evolution that we have been considering, and perhaps there is no time in her life when it is so difficult for her to have the sort of food most needed. The little child in the nursery is usually fed according to the wisdom, or the ignorance, of its parents; the young woman who has reached maturity, has, it is to be hoped, acquired some sort of a working knowledge of the needs of her own constitution, and unless she is really bereft of common sense, she will take such food as fits her to enjoy the duties and pleasures of life. But the adolescent girl has, in most instances, got beyond the discipline of the nursery, and yet she has no knowledge of hygiene and dietetics, either theoretical or practical, to guide her in her choice of food. On the contrary, the general incoherence and inco-ordination of her nature shows itself very specially in her choice of food. In many instances she selects such innutritious articles as buns, cakes, sweets, ices, and fruits, as her staple food. Now, no one can say that such things are bad in themselves, nor can they allege that they should be struck out of the girl's diet sheet, but the trouble is that they are not suited to be the foundation diet. One good and practical rule is, that the girl should in health have four good meals a day, and that she should take nothing between those meals.

Breakfast should consist in the first instance of some form of cereal food of which there is an ample variety—oatmeal porridge, Quaker Oats, Grape Nuts, Force, shredded wheat biscuits, bread and milk, and many others. In all cases, at least half a pint of milk should be taken. After this ordinary breakfast-dishes, such as bacon, eggs, fish, tongue, ham, etc., with coffee (which should be nearly all milk) may be allowed,

finishing with bread and butter, with marmalade or fresh fruit. Upon such a foundation a girl can cheerfully work for three or four hours, and requires nothing more until the middle-day meal. At the middle-day meal there should be a sufficiency, but not too large a supply, of plainly cooked meat, or fish, together with plenty of vegetables, and either pudding or fruit. The difficulty in the case of many school girls is that such a middle-day meal is altogether unattainable, it is not provided for them at school, there is no time to go home, eat a meal and return, and if the girl buys her midday meal it is pretty certain that she will buy it at a confectioner's, and that probably it will consist of sweet cake and a glass of milk. The meal at the confectioner's can never take the place of the properly cooked hot meal with its meat and vegetables, but if the girl really understood what was good for her she would buy meat or ham sandwiches, which are nourishing although perhaps not fascinating, and in many instances sausages are procurable.

For girls who have had a substantial meal in the middle of the day bread and butter and milk, or milky tea, is all that is absolutely necessary for afternoon refreshment, but in the case of those who have been unable to get a satisfactory early dinner the tea should be supplemented so as to more or less resemble the substantial breakfast. Girls who have had a light tea will require rather more supper than the others, but the evening meal should never be the chief meal of the day if any other arrangement is possible.

As a matter of fact, the chief requirements in the way of food are: one quart of milk in the day, two meals into which meat, or fish, or poultry enter, with a sufficiency of fresh vegetables and fruit, and two lighter meals. These articles of diet, in sufficient but not too great quantity, must be distributed as fairly as possible throughout the day, due regard being had to the circumstances of each girl's life. To one rule there should be absolutely no exception—young people need no alcohol, and therefore ale, stout, and wine should never enter into their dietary. The time is not so long gone by when it was thought an advantage, especially in the case of delicate girls, and in the case of girls who had to work very hard, that they should have a little alcoholic stimulant; luckily, these days are gone, and with them the risk of much indigestion, functional at first, but frequently leading on to grave organic disorder, not to mention the extreme danger that a habit may be formed for needing and expecting stimulant, and of indulging in it in a constantly increasing amount.

The second primary necessity of life is sleep, and of this there is no doubt that young people get far too little. Up to the end of childhood twelve hours is about the right allowance of sleep, and all through

adolescence nothing less than ten hours suffices. It is, however, quite impossible that young people who are allowed to sit up to nine or ten o'clock at night, either at their lessons or for recreation, can have the requisite amount of sleep, because in nearly all instances they have to get up at seven in the morning in order to have their breakfast and be ready for school. All adolescent girls ought to be not only in bed, but asleep, by nine o'clock, and therefore they should retire at eight p.m., or soon after.

One knows quite well with what disapprobation this advice will be received by the girls themselves, and even by some of their elders. The argument is that the girl gets in from school at five o'clock or later, that she then has to have her evening meal, and subsequently has home lessons to prepare : Where is her time for the reading of light literature, for games, and other amusements ? Thus stated, the case seems hard, but, as a matter of fact, a considerable part of afternoon school is devoted to the lighter side of education—drawing, needlework, athletics and games, music and singing, which may very fairly be reckoned as recreation ; and it is perfectly certain that young girls are far better without the exciting and often demoralizing literature that they read when left to choose for themselves. There are plenty of holidays in the year, and during the holidays a mental regimen closely resembling cakes, sweets, and ale, is largely indulged in by many young girls. Far more unproductive recreation, such as novel reading and games of chance, are permitted during the holidays than is compatible with perfect moral and spiritual health.

The rule as to sleep ought to be enforced not only in every private house, but also in our schools. One of the gravest blots on the existing arrangements in boarding schools for both boys and girls is the absolute disregard of the necessity for sleep during adolescent years. In our large towns and in our country lanes quite small children and adolescent boys and girls may be seen dancing, singing, or wandering about up to ten and even eleven p.m. ; there is no wonder that they go to school half asleep, and too much exhausted both in mind and body to profit by their education.

Exercise.—The conscience of the nation is far better instructed now than it was fifty years ago, but even so, wealthy England lags behind the poorer Scandinavian nations in the provision of regular exercises and organized games for all classes of the community. Adolescent girls need these health-giving exercises as much as do the boys, but a certain amount of wisdom and care must be exercised lest that which ought to be an unmixed blessing should, in some instances, become deleterious. In every large class of young girls there will be those who ought to sit

down and watch their companions for two or three days at a time. In every young girl's life there are days when she feels less than her best self, and when exertion is, to say the least of it, unwise and disagreeable. A wise gymnastic instructor, and a careful games mistress will know by instinct which are the girls who need this special care, and it ought to be thoroughly understood by the class that it must be expected that every pupil in her turn will have to forego the drill and the games.

While on this subject it might be well to remark that although the Swedish system of gymnastic exercise is, as far as we are able to judge, by far the most rational, the most perfect, and that which is likely to train every muscle and every nerve in the body in the most admirable manner, the carriage of girls whose only exercise consists of gymnastics develops a certain stiffness and angularity. To obviate this there should be a large admixture of games and dances, accompanied when possible with music and singing. Swedish gymnastics cannot be done to music, but many games and dances can, and this secures the introduction of a most valuable element into the training of young girls. There is a subtle influence both in the poetry of movement as exemplified in dances, and in the poetry of sound as displayed in music, as Wordsworth said :

> "And beauty born of murmuring sound shall pass into her face."

The Swedish exercises, with their wonderful precision, order, and development of obedience to the word of command, tend to cultivate in the girls' minds as well as in their bodies certain necessary characteristics, but this sterner side of tuition needs to be accompanied by the more graceful, poetical, and spontaneous teaching of music and dancing.

The next class of exercises to be strongly recommended for adolescent girls comprises various forms of team games, such as hockey, cricket, and basket or net ball. One great advantage of these games is that not only does their success depend on the prompt and cheerful obedience rendered by the players to their captain, but that they favour the growth of *esprit de corps* and unselfishness. Each member of a team feels that the welfare of the whole depends in a great measure on her, and she learns to subordinate her individual interest to the advantage of her side. These games must, however, be played under the careful supervision of a really capable mistress, who is herself an enthusiast and an adept. Like all other valuable methods of training, there is need for real care, lest ambition and selfishness should creep in and spoil the effect for which one hopes. A short time ago much harm

was done by matches between schools or counties. This stimulated an undesirable and unhealthy form of rivalry, and too often led to physical and moral injury. There is an essential difference between boys and girls in their outlook both on lessons and on games. The boy is far more content to do his best and to be satisfied with it, whereas the girl too frequently not only wants to do her best but has a very strong desire to excel her companions. It has often been found that girls have been rendered ill, and in some cases have been entirely invalided, by a too strenuous pursuit either of academic distinction or of schoolgirl fame as an athlete. The evil is now recognized, at any rate in some quarters, and will no doubt be efficiently guarded against in the near future; tournaments and interscholastic games will be reserved for very rare occasions, whereas what may be known as "practice" games are becoming increasingly popular. Amongst the other evils of the interscholastic matches must be reckoned the extra fatigue and inconvenience caused by the necessary journeys, and the fact that the visiting team not infrequently is unable to obtain a bath or even a wash down and a sufficient change of clothing. In all strenuous games these precautions are necessary.

It is unfortunate that up to the present girls have not been able to participate in any large degree in the admirable movement that has done so much for the training of the young boys as Boy Scouts. The influence of this movement appears to be wholly good. The simple threefold promise of implicit obedience, of work, and of love, does much to secure a good moral tone in the members of the corps, while the careful training that they receive in observation, in precision of movement, and in brotherliness, is admirable. It is to be hoped that in the immediate future a similar training may be provided for girls. They, too, should be bound by the simple promise of obedience, purity, and love; they, too, can be trained in habits of observation, their muscular systems can be developed by suitable exercises, and perhaps in place of some of the more evidently boyish occupations, they could be taught the elements of simple cookery, washing, and first-aid, such as would fit them to be very useful comrades of their brothers.

During the holiday time it is particularly sad to see the swarms of girls sitting on the doorsteps or loitering about the streets while their young brothers are happy in scouting or as cadets in a brigade, and the elder brothers have joined the Territorials, and may, if they so will, be making themselves worthy to be coadjutors of the Regular Army.

There must always be a certain amount of objection to what one may fairly call *unproductive recreations*, but this uncomplimentary description cannot be applied to exercises, team games, and beyond all, to some

modification of the scout movement or voluntary aid in one of its many forms.

Swimming is another exercise particularly useful both in its immediate effects in developing the muscles and improving the health, and also in its more remote effects. Girls can swim just as easily as boys, and there would be far fewer fatal accidents from bathing and boating in the summer holidays if boys and girls alike were taught an exercise which seems peculiarly suitable to the children of an island people.

Dress.—The object of dress is twofold : to afford a decent covering for the body and to protect it from extremes of heat and cold. Practically in too many instances these fundamental objects are lost sight of and dress is considered chiefly from the point of view of an adornment. Sumptuary laws, much preaching and exhortation, have always failed to secure reason and good taste in the matter of dress, and probably at few periods of the world's history has dress fulfilled its twofold object less adequately than it does at present.

A good example set by those whom the girls admire and wish to imitate will help most, and this influence should be helped by a practical knowledge of elementary physiology and hygiene.

Among the chief sins of the adolescent girls in the matter of dress are the love, not only of the corset, but of the very tight corset, the addiction to tight belts and excessively high-heeled shoes. Every one of these fashions is deleterious. The tight corset constricts the lower ribs, displaces the viscera, and gradually alters the balance of the body, the hips being thrust backwards and the shoulders too far forwards; hence much dyspepsia, with its attendant constipation, palpitation, precordial distress, and giddiness. The high-heeled shoes not only render the wearer liable to accidents, but also entirely destroy the natural poise of the body, and gradually induce deformity of the feet. The elder adolescent girls are also at the present time disposed to dispense with the really necessary undergarments in order to cultivate what they consider an elegant and sylph-like figure, and, indeed, it it difficult to understand how much can be worn under their exceedingly skimpy frocks !

Such, then, is the adolescent girl, a bewildering mixture of the bright, the beautiful, the heroic, the difficult, the elusive, and the incoherent. The problem for parents and for teachers is, how are we to emphasize and develop all that is desirable, and how are we to eliminate, or at any rate to repress, the less desirable side of the girl's nature? One thing we have to remember is, that although there is a sad lack of balance, and although our patience, tact, and wisdom are likely to

be taxed to the uttermost, yet the reward is great and the possibilities are great. The very characteristics that try us most are really the *défauts de ses qualités*, the over-exuberance, it may be, of the very instincts which, if guided aright, will, after a few short years, make our tiresome adolescent the "perfect woman nobly planned." The loud-voiced hoydenish girl whose gestures and words appear to us a mixture of rudeness and vulgarity, is really displaying to us the vitality and high spirits that, under wise guidance, will enable her to play her part well in future life. The plant is not to be uprooted, it is to be pruned and to be trained; we ought not to wish to destroy the girl's characteristics, but to help her to gradually develop them beyond the stage in which they are offensive, and to assist her to attain her full development. One should have far better hopes of a really tiresome girl full of character with generous impulses and inconveniently decided opinions, than of some too well-behaved and inadequate miss, in whose nature there is not stuff enough to make a woman.

ALFRED BINET (1857–1911).

By Prof. Ed. Claparède.

Translated from the "Archives de Psychologie" *by the kind permission of the Editor and Author, Prof. Ed. Claparède, by* Mary Louch.

James first, then Binet!

There could be no greater trial for psychology than this fresh loss. Alfred Binet died in Paris on October 18, 1911, from the effects of apoplexy. He had been suffering of late from fatigue, which was attributed to overwork, a diagnosis suggested quite naturally by his indefatigable activity. But the trouble, alas! was more deeply seated, and it was with real grief that psychologists throughout the world heard of the cruel event which deprives them of a colleague and master, universally loved and respected.

Binet was, without doubt, one of the most eminent of contemporary psychologists. The service he rendered to our science is inestimable. As a writer of talent, perfectly clear in thought and utterance, and endowed with a mind of a severely scientific type, he gained the esteem both of the public at large, whom he initiated into the problems of empirical psychology, and of specialists whom he furnished with a

quantity of new points of view. His mind was the most inquiring, the most observing, the most subtle imaginable, a true researcher. When investigating he showed astonishing ingenuity in catching in the act the thinking mind, the passing thought, or the most subtle processes of mental activity.

But ingenuity must not here be taken to mean complexity. Although Binet instituted the first French psychological laboratory, and invented some apparatus, it was not in experiment requiring apparatus that he made his reputation. The finest and most fertile of his researches were carried on outside the laboratory, and for all of us he will ever be the clever experimenter who used hardly any apparatus beyond "a pen, a piece of paper, and much patience." (*Cf.* Binet, *L'étude expérimentale de l'intelligence*, p. 9. Paris, 1903.)

And yet he was in truth an experimenter. No one had the experimental sense in a greater degree, nor showed more devotion to the experimental method, that is, to the truths that facts reveal, as opposed to random, preconceived affirmations. He tried to cultivate around him, especially in pedagogic centres, respect for impartial and disinterested control of affirmations circulated. Thus he rendered signal service. And still more by example than by words he brought out this principle—that in science there is no such thing as a *chose jugée*. We constantly find him, to the detriment of his previous publications, reconsidering certain experiments, modifying his formulæ, correcting and improving them (*e.g.* the successive improvements to his scale of intelligence). He was always ready to give up a conclusion if it could be shown to be insufficiently proved. He was scientific loyalty incarnate.

Alfred Binet was born at Nice, July 11, 1857. We find him quite early in life, when his study of law had hardly come to an end, turning towards experimental psychology, that still new science which M. Ribot's earliest works had just revealed to a French public. In 1880, Binet publishes in the *Revue Philosophique* a study, *De la fusion des sensations semblables* ("On the fusion of similar Sensations"), in which he tries to explain the fusion of impressions produced by the points of Weber's compass. In 1883, he publishes also in the *Revue Philosophique*, some thoughts on the reasoning involved in perception, which he collected later in a little volume entitled, *La Psychologie du raisonnement* (Paris, 1886).

At this time Charcot's teaching was at its height. The inquiring mind of Binet could not fail to be attracted to La Salpêtrière. Our young psychologist found his way into it, made his observations, and soon began to experiment on hysterical and hypnotic subjects. A

great many notes by Binet date from these years (on *hallucinations*, *Rev. Phil.* 1884; on *hypnotism*, the *intensity of mental images*, *responsibility*, etc.). These researches, carried out with the collaboration of his friend Féré, are collected in the two works, *Le magnétisme animal* (1886), and *Les altérations de la personnalité* (1892), which are epoch-making in the history of hypnotism. At the same time he was interesting himself in very different subjects, in the *psychic life of micro-organisms* (1887), and *in fetishism in love* (same date). These studies, together with others, have been published together in one volume (Paris, 1891).

In 1889 Binet and Professor Beaunis founded the Psychological Laboratory of the Sorbonne. In 1894 he became the director of this laboratory after having written his thesis for the degree of D.Sc. This thesis, entitled *Contribution à l'étude du système nerveux sous-intestinal des insectes*, had been prepared in the laboratory of Balbiani, whose son-in-law Binet had become; it is much more anatomical and histological than physiological, or, above all, psychological, and it shows the extraordinary aptitude which Binet possessed of being profoundly interested in work of different kinds at the same time. The same year he wrote a short *Introduction à la psychologie expérimentale*, which has preserved its interest to the present day.

From the time that Binet accepted this position at the Sorbonne the more important of his works appeared, the greater part published regularly from 1895 in the *Année Psychologique*, which immediately took its place among first-class periodicals. In the first volume of the *Année*, we find Binet attacking a new problem, that of *literary creation*, which he began by making a personal analysis, based on interrogation, of a certain number of dramatic authors (Sardou, Dumas, Daudet, de Curel, etc.). In the next volume he lays the foundations of *individual psychology*, and shows its wide range. Already before this he had penetrated, with his usual ingenuity, the mental secrets of calculating prodigies and chess players, *Psychologie des grands calculateurs et des Joueurs d'échecs* (Paris, 1895), and had interested himself in coloured audition (*Rev. des Deux-Mondes*, October 1, 1892). The third volume of the *Année* contains the well-known experiment on *description of an object*, and the fourth contains the first experiments on *suggestibility*, which were destined to develop later, and to be the subject of the book, *Suggestibility* (Paris, 1900).

At the same time Binet was carrying on a research in child-psychology, the origin of which is easy to guess. Having become the father of two little girls, he quite naturally interested himself in the development of these two little beings who were growing up at his

side, and from 1890 we find him publishing in the *Revue Philosophique*, the results of different experiments on *the movements of some young children*, on *perception of length and number in some little children*, on *percepts of children*. In 1894 he undertook an *inquiry into the character of children*, and studied the *visual memory* and *suggestibility* of children. In 1895 he experimented on the *measurement of visual illusions in children* (*Rev. phil.*). It is well known that this interest in child-psychology and its application to pedagogy went on increasing to the end of his life. In 1894 he conceived the brilliant idea of going into schools in order to carry out collective experiments in them, and thus "save time." Binet was fortunate in being assisted by intelligent school-teachers, and his observations accumulated in extraordinary fashion: observations on *the memory of words and sentences* (*An. ps.* i.), on *children's fears* (*An. ps.* ii.), on *muscular strength*, *fatigue*, *breathing*, in young boys (numerous reseaches made in collaboration with Vaschide which fill the fourth volume of the "Année"); on the *influence of intellectual work on the consumption of bread* (*An. ps.* v.); see also *La psychologie à l'école primaire* (*An. ps.* iv.), etc. The end Binet especially had in view in his research was to discover tests which would make possible the diagnosis of intelligence, or the establishment of certain groups or families of minds. Later, giving up physical tests which he had carried to their extreme limit, he turned his attention to mental tests. In 1901 he tried to determine different types (observational, imaginative, interpretative, simple, etc.), according to the way in which the subject behaved in regard to experiments with Weber's compass.

This is the place to mention the fine monument which Binet raised to the individual psychology of intelligence as well as to the psychology of thought, *L'étude expérimentale de l'intelligence* (Paris, 1903). This book, the aim of which is to study the personal factor in ideation, sets forth the experiments made by Binet during a period of three years on his two little girls at that time aged respectively thirteen, and fourteen and a half years. He showed that while one, Marguerite, was a fine specimen of the observational type, the other, Armande, represented the imaginative type, and he tried to find out by what other mental characteristics this difference between the two sisters revealed itself. By means of a fine analysis, made with their intelligent collaboration, Marguerite and Armande are well known to all psychologists. At this moment the two sisters are mourning: our thoughts have been with them in the trial which has befallen them.

Alfred Binet's name will always be associated with those of the creators of experimental pedagogy. In the preface to *La fatigue intellectuelle* (Paris, 1898), which was written in collaboration with

V. Henri, he condemns in severe terms (perhaps rather too severe, but nevertheless just) old-fashioned pedagogy, and especially the method, or rather the absence of method, of traditional pedagogy. One can trace all the work accomplished by Binet from this time onward, by reading his recent book, *Les idées modernes sur les enfants* (Paris, 1909), which is hardly anything else, but that is much, than a *résumé* and a co-ordination of his own works.

In 1900, Binet created, together with F. Buisson and Madame Kergomard, the venerable lady-inspector of the *écoles maternelles* in Paris, and our lamented friend, Marillier, and yet others—the *Société libre pour l'étude psychologique de l'enfant*—a strong association with affiliated societies in various towns in France, of which Binet was so intrinsically the soul, that one asks one's self whether his death will not put an end to it. But Binet gave it an impetus which will survive him; the seed he has shown has already sprung up, and we are certain that this splendid work will not be endangered in the hands of such men as Malapert, Belot, and, above all, Monsieur Vaney, the sympathetic director of the primary school in Grange-aux-Belles Street. It was in this school that Binet founded, in 1905, a small school-laboratory for normal pedagogy; from this laboratory have emanated some important observations on the *sight of schoolchildren*, the *measurement of auditory acuteness*, the *effect of the attitude of a child at its desk on the amplitude of respiration*, etc.; these observations were published in the *Bulletin* of the *Société libre*, which has come out regularly since 1900.

We have now come to the time when the question of abnormal children began to attract attention in France. While Germany, Belgium, and Switzerland had for a long time arranged special instruction for children of this kind, nothing had been provided for them in French school organization. In 1902 the *Société libre* recommended a medico-pedagogic inquiry in schools. But it was only in 1904 that the Minister of Public Instruction appointed a commission composed of medical men, educators, and scientists to inquire into the matter. Binet was invited to take part in the commission, and he became one of its reporters. From that time he devoted himself entirely to the solution of the new problem which had been presented to him. He perceived at the outset the enormous difficulty of the problem, but the very difficulty stimulated his ingenuity. From the first he was struck by the vagueness of the terminology relating to the abnormal, which confused and sterilized the discussions of the commission. For all these inexactitudes, for the medical classifications so ill-adapted to the pedagogical end in view, Binet hoped to substitute a scientific criterion of backwardness, the only way of doing serious work.

At the same time I was myself occupied in gathering statistics relating to abnormal scholars in Geneva, in view of the reorganization of their instruction. Binet frequently wrote to me to tell me of his results, and to ask me for mine. I extract from one of his letters, dated March 14, 1905, the following lines, in which allusion is made to the work of his commission:

"We are asking ourselves of what use these school-asylums will be to idiots and imbeciles. They are what the bottle is to the ink. There is no agreement about definitions. Also the doctors will not say what the children are that they receive, and one does not know scientifically to what extent they are benefited. I meet with opposition of all kinds. I am at work on the precise definition of degrees of degeneration, and also I have begun a study of one hundred abnormal children from the school. I am overwhelmed with work. I would that the distinction between the normal and abnormal were known, defined exactly, so that confusion (hooking-on) might be avoided. How far have you got? It takes long to write one's thoughts; it would be better to talk."

This fragment of a letter clearly shows with what ardour Binet entered into the questions he took up. As a member of the commission, he deeply felt the responsibility he had assumed, and he had eyes for nothing but the problem which had to be solved. But what is this "opposition of all kinds" to which he makes discreet allusion? It is perhaps not difficult to guess. It had to do, no doubt, with the opposition of doctors who were not satisfied to see a psychologist, a stranger to their caste, trying to discover methods of diagnosis which were not included in the usual criteria for treating mental diseases. In these days such opposition would no longer be understood, so much has the matter progressed during the last six years. Do we not everywhere see the medical profession getting hold of the tests of physchologists in order to deal with mental phenomena? Other difficulties, doubtless, arose from the number of arrivals in the field, who crowd in from all directions as soon as some new question becomes the subject of official inquiry, and who, hoping to derive some profit for themselves, are not very well pleased to see one who is a stranger to their set in the act of solving the question. Binet was the sworn enemy of these incompetent self-seekers. What a nice little picture he has left us of them!—

"Since the problem of abnormal schools has arisen, many kinds of ambition are in evidence around us. Interests, frankly personal, hide under a mask of philanthropy, and he who dreams of making a nice position for himself in the schools for abnormal children never speaks

of them without tears in his voice. These are the eternal comedies of human life; there is no need to get indignant with them. Every one in life has a right to consider his own interest, if, in considering them, he does not compromise interests superior to his own, namely those of the community. It is this general interest which is pre-occupying us . . ." (Binet, *Les enfants anormaux*, p. 15. Paris, 1907).

In order to facilitate the work of the commission, Binet published his first researches, carried on with the assistance of Dr. Simon, on the *Metrical scale of intelligence* (*An. ps.* xi., 1905). These researches were completed and perfected later (*An. ps.* xiv. and xvii.) and resumed in his book *Les enfants anormaux* (Paris, 1907), which has become the breviary of those engaged in "special" teaching. This scale of intelligence, so happy in its simplicity, will remain one of the claims of Binet to the gratitude of pedagogues. It has given rise to a quantity of analogous inquiries, and most authors, as, for example, Decroly and Degand in Belgium (*Archives de Psychologie*, vi. and ix.), Goddard in America, Mlle. Descoeudres in Geneva (who in the current number of the *Archives de Psychologie* has given an account of her experiments, dedicated to the memory of Binet), have all testified to the general value of the scale of Binet and Simon.

This measurement of intelligence naturally led Binet to ask himself a number of questions as to the nature of the process which distinguishes one mental level from a preceding one in the hierarchy of function. And so we find Binet in the latter years of his life launching into mental pathology. He thought, and rightly thought, that the psychogenic method (which consists in arranging in a series a certain number of backward children according to the development of their intelligence, in order to see how one particular phenomenon acts throughout the series—for example, grief or attention) would permit of perception of the stages which a phenomenon presents, and of its process of evolution. It may well be imagined that Binet did not expect to solve this problem by shutting himself up in his study: he frequently visited the asylum at Rouen, of which Dr. Simon is the physician. The important and ingenious observations which may have been made during these visits are to be found in the three last volumes of the *Année*. They teem with new perceptions, and promised still more results than have been up to the present achieved. Binet was working at this renovation of psychiatry when death removed him.

(*To be continued.*)

SUGGESTIONS FOR PARENTS AND TEACHERS.

The Cultivation of Respect.—"A due regard to a respectful attitude is often wanting before the little child, and this negligence has all the more influence upon him as he tends to be brought more into contact with older persons. He is apt to hear his friends, regardless of his presence, talking together without thought, criticising or reproaching one another, sometimes even displaying their disagreement on the subject of his proper treatment. Thus more or less consciously he concludes that his friends are not free from fault, and, more than this, he acquires the habit of speaking to them as he has heard them speak among themselves.

"Often, too, his parents do not expect enough from him; they put him on an equality with themselves, one would almost say on a superior footing, obeying his wishes, even indeed his orders, and rarely demanding obedience from him. As a result the child not only acquires bad manners, but also an exaggerated feeling of his own importance, and a false idea of his relation towards his elders. Further, those who have charge of the education of the child are sometimes criticised in his presence, even at times ridiculed, whilst relations and friends are discussed, not so as to call attention to their good qualities, but too often in such a way as to bring to light their faults, and national institutions and officers of the state are made light of."—*Bulletin de l'Education morale de la Jeunesse*, Groupe de Rouen, December, 1911.

The Order of Speech Development.—"It is not without interest to determine in what order the words belonging to the different parts of speech are retained in the verbal memory of the child, and thus, what lines of words he learns most easily and quickly. All observers agree that nouns are the first words to hold a place in his vocabulary and to dominate it. The little one, whose intelligence is at first only a succession of perceptions and intuitions, tends in the first place to mark off by their names the things he is shown and which interest him. Verbs, which express an action or a feeling, come after the nouns. Adjectives, likewise, except those which designate sterling qualities or are descriptive of bodily feeling, as white, black, hot, cold, come only into the third rank. Later still are the pronouns, even the personal pronoun I; we know how reluctant the child is to use it, and how long he takes to drop the habit of speaking of himself by his own name. Lastly come the adverbs—except those which show situation, as above, below, and which are among the first—and conjunctions and prepositions. Thus, progress in language follows closely the evolution of intelligence, which, at first

imprisoned in sensations, raises itself by degrees to reasoning and the conception of relations."—*Dr. G. Compayré*, in *L'Educateur Moderne*, December, 1911.

Formal Training.—"By 'formal training' I understand the influence of practice and improvement obtained in one mental function producing improvement without special practice in another mental function" . . . [Psychologists] "believe that spread of practice occurs only where identical elements are concerned in the influencing and influenced functions . . . What then are these common elements? . . . We may, I think, refer them to three broad heads: (1) Certain specific habits and movements may be common to many different processes. For instance, control of hand, control of voice, control of eye—these are the products of special training, and enter into many different activities. (2) Certain specific ideas and memories may be useful for many different processes. The idea of logical reasoning, the memory of certain schemes or methods of argument or manipulation—these, again, may be acquired through education, and exploited upon subjects widely different in their nature. (3) We must not forget the affection or emotional aspect. In developing what we call 'interests,' and in inculcating what we call 'motives,' the training of the emotional element, the development of moods and attitudes as reactions to certain classes of objects, is perhaps the most essential part of the process of education. . . . The commonest elements are not habits that occur from practice, or faculties that can be developed like muscles, but ideas and methods that come from experience. The practical corollary seems to be this: emphasize and extend, not the elements peculiar to and characteristic of school and school conditions. Emphasize and extend the elements shared by the curriculum and the conditions of school in common with the conditions and requirements of life"—*Cyril Burt, M.A.*, on "Experimental Investigations of Formal Training" in *School Hygiene*, February, 1912.

Dangers in Choosing a Trade.—"You must be on your guard against the common error which mistakes the effects of environment for the ardour of genius, or imagines there is a decided bent towards any one of the arts, when there is nothing more than that spirit of emulation, common to men and monkeys, which impels them instinctively to do what they see others doing, without knowing why. The world is full of artisans, and still fuller of artists, who have no native gift for their calling, into which they were driven in early childhood, either through the conventional ideas of other people, or because those about them were deceived by an appearance of zeal, which would have led them to take to any other art they saw practised. One hears a drum and

fancies he is a general; another sees a building and wants to be an architect. Every one is drawn towards the trade he sees before him if he thinks it is held in honour. . . . There is all the difference in the world between a liking and an aptitude. To make sure of real genius or real taste in a child calls for more accurate observation than is generally suspected, for the child displays his wishes not his capacity, and we judge by the former instead of considering the latter. I wish some trustworthy person would give us a treatise on the art of child-study. This art is well worth studying, but neither parents nor teachers have mastered its elements" [in 1762]—"Emile," translation by *Miss Barbara Foxley, M.A.*

NOTES.

Our Annual Conference.—Members of the Societies are asked to take particular note of the programme of information, concerning the meetings on May 9, 10 and 11, which is sent with each copy of this number. The circular is quite separate, so that it can be easily kept for reference, and taken to the conference and used as a programme there.

It is important that the form on p. 4 should be filled in and returned to the Hon. Sec. of the London Society. This will greatly assist those responsible for making all arrangements with our hosts, etc., and may prevent considerable inconvenience being caused to them. The issue of this number has been delayed to include the programme.

As it has been decided that the papers shall be printed, and be accessible to those attending the conference beforehand, they will be taken as read at the meetings, and the time given to discussion. The writers of the papers will be allowed twenty minutes to give any further points or comments, and so introduce the discussions. To make this procedure of the greatest possible value to those present—which is the reason for its adoption—members must freely join in the discussions, and fill in the form on p. 4 to this effect.

Owing to the coal strike it will probably be impossible to arrange for cheap fares, and those coming from a distance must act accordingly.

Our Library Catalogue.—This has been brought up to date for March, 1912, and is issued as a separate pamphlet. Every member of the Societies will receive a free copy, by virtue of the capitation fee paid on his behalf. The copies go to the various societies with this number of the Journal. Each member should see that he gets his copy, as there are many valuable books in the library, and these may be loaned by members, on the terms set forth in the catalogue.

Combined Annual Reports.—The Council has decided that an endeavour shall be made to issue annually the reports of all the Societies in pamphlet form. It is believed that this will be of considerable value in giving suggestions to the individual societies, through their thus knowing what others are doing, and how they are doing it; and also that such pamphlets will be of very great use for distribution for propaganda purposes. They will be produced at the cheapest possible rate. Only by the consent and cordial co-operation of the different constituent societies, however, will the issue of such a pamphlet be possible.

A Conference on Diet in Schools.—The National Food Reform Association has organized, through a very widely representative special committee, a conference on diet in public secondary and private schools. It will be held in London on Monday, May 13, in the Guildhall, and the Lord Mayor (Sir Thomas Crosby, M.D.) will preside. Papers will be read on the following topics: "Diet as a factor in Physical, Intellectual, and Moral Efficiency," "Existing Methods," "The Main Lines of Reform," "Instruction in the Elements of Physiology and Personal Hygiene," "Problems in Institutional Feeding," "Training in Institutional Management."

It is proposed to call a further conference to consider the feeding of elementary schoolchildren and those in charitable institutions. Further information as to membership, etc., can be obtained from the Secretary, National Food Reform Association, 178, St. Stephen's House, Westminster, S.W.

The Parents' National Education Union.—This Union is holding a Children's Gathering at the Guildhall, Winchester, on May 6, 7, 8, and 9. An exceptionally interesting series of meetings, lessons, excursions, etc., have been arranged. Further information can be had from Miss Parish, P.N.E.U. Office, 26, Victoria Street, London, S.W.

International Moral Education Congress.—The second congress will be held at The Hague, August 22 to 27, 1912—the first was held in London in September, 1908. Papers will be read by representative people from most of the European countries, Australia, Egypt, India, and the United States. We notice that Mrs. Mumford (Manchester) and Dr. Hayward (London), of the Child-Study Society, are contributing papers. Full particulars about the conference can be obtained from Mr. Fred Charles, 22, Park Crescent, Church End, Finchley, London, N.

CORRESPONDENCE.—Co-Education.

Sir,—The question of co-education has scarcely yet left the stage of general discussion, of mere expression of personal opinion. The weight of a personal opinion depends on the person, but, in any case, it is not universally, equally, and permanently convincing in the same way as is a body of hard facts. We state our impressions, our inclinations, our "moral certainties," our personal preferences; these do not form conclusive evidence, since an equal array of opposed impressions, opinions, and preferences may be brought against them.

To get beyond this stage we must proceed along more scientific lines; we must stiffen our arguments with facts, demonstrable and provable facts. It is true that we may not hope to express the best results of co-education in this way—those results that are most subtle and far-reaching in building character and developing personality. Such claims must, perhaps, for a time at least, be still supported by personal opinion based on facts of long experience. Facts of observation, results of experiment, statistics are wanted. They convince by the weight of accumulation. The collection and careful arrangement of general and special data may provide some ground for drawing definite conclusions which will stand repeated assault and may come to be accepted as recognised truths.

The arguments of convenience and economy in small schools are of great weight in particular and specific cases, but in discussing the advantages of co-education as such they must be left aside.

In physical education the advantages of mixed education may seem to be smallest. But as physical development is at the foundation of personality and character, so this

side of co-education gives boys and girls some of the most important experiences of each other's capacities and characteristics. The game is not always to the swift and the strong. Moreover, women, rightly or wrongly, claim to meet men on level ground, on equal terms, and yet under differing natural conditions, of which not the least obvious and important are physical. The co-education playing-field provides four or five years' experience on this question which must be of the highest value in later years. The defeat of the VI. form boys by the girls in a recent netball match had moral and social values such as no class-room lesson could have provided.

In intellectual work the traditional disadvantages of girls have not shown themselves. Science and mathematics taught by men have been as enthusiastically and successfully pursued by the girls as by the boys. The teaching of history, languages, and literature by women has revealed no special superiority in boys or girls. More than half the successful candidates at matriculation have been girls with an average age below 16 years. It is highly probable that girls have the advantage over boys during the ages 12–15 years.

When curricula are prepared with much more general relation to the interest and demands of life than is now commonly the case there would perhaps be less objection to joint studies. If concessions are made in chemistry to domestic interests, there are many reasons why boys should experience the same facts of life here as girls. Girls, too, may be just as reasonably interested in the application of physics to heating, ventilating, electric lighting as boys.

The moral and social values of co-education are obvious to the teacher, and still live in the memory of some of us. Prof. Davis, of Minnesota, writes: "There can be little doubt that in elementary classes the fact that inexact, sluggish-minded youths are obliged to see their dulness exhibited daily before keen, precise young women is a vast incentive to those youths to do their best." Is it not possible that the free and easy, untroubled attitude of the boys may have its steadying effect upon the tense concentration and feverish application so often shown by the girls? Statistics are wanted here, too. Girls ought to be taught in part by men, and boys by women. But a class of girls only, taught by a vigorous man, would sadly miss the brake of the average boy. It is obvious that boys and girls have much unconscious influence upon one another. As a result there is truer esteem of capacity and place, and a higher appreciation on both sides which is serving to dispel many dangerous and deep-seated prejudices.

Boys and girls thrown into intimate relations before the age of, say, 13 years will behave sanely and normally throughout their school course. The same cannot always be said of boys and girls attending neighbouring schools.

The moral and social gains depend partly upon the clearer understanding and truer knowledge gained by both sexes during years of daily and intimate contact. Better and generally greater appreciation follows on both sides, and thus the foundation of future relations is more fairly laid. But this is not the end of such gains in co-education. Social education is very limited in a boys' or girls' school, because the half of a society is absent, consequently joint activities are impossible. Not only must some branches of school work suffer, especially the artistic side of culture, such as music, and to a less extent art, but many interests outside the class-room are uncultivated.

H. E. Piggott.

Hornsey County School, Feb. 14, 1912.

Sir,—Miss I. de C. has given us a very interesting account of her impressions of the value of co-education to herself and her girl friends. Her remarks on the keenness of the co-educated young people to leave school are particularly suggestive and set one thinking. Why are they so keen to leave school?

A. Coed seems to think the "home" resembles the mixed school in being the antithesis of separate schools. But the ideal home stands about midway between the two; for while, like the mixed school, it affords an admixture of masculine and feminine influences, like the separate school it absolutely excludes sex love (between its younger members).

If the presence of other fellows' sisters, and other girls' brothers, makes no vital difference between the mixed school and home; or if that difference is assumed to be a beneficial one, then is our discussion vain. To dub the mixed school system "natural" and to posit it as opposed to the monastic system seems like begging the question by implication. It is "natural" to return evil for evil, but is retaliation better than monastic forgiveness?

The monastic system may yet find some justification in the ever-increasing specialism of to-day. Thane expressed an opinion (*Child-Study*, p. 129) on the limitations to co-education imposed by differences of after-life, and I need only remind A. Coed that girls cannot play either of the chief games of young men, to wit cricket and football.

Having shared and conducted mixed classes in biology, hygiene and first aid, I am not prepared with the list for which A. Coed asks, but I dare say I could start such a list with the subject of "instruction in sex hygiene."

BERESFORD KINGSFORD.

REVIEWS.

L'Educateur Moderne. December, 1911. To the last issue of the year the editor, Gabriel Compayré, contributes a valuable review of some recent work, French and American, on the development of language in children, which would well repay perusal, and Dr. Saurent begins the consideration of the relations between brain growth and psychic evolution. This article should be studied if only for its clear account of brain physiology. T. G. T.

Bulletin de L'Education Morale de la Jeunesse. December, 1911. In the December issue is a thoughtful report of the Rouen group on the question of the development of the feeling of respect in children, and a brief discussion of one aspect of the problem of training children to obey, both of which are worthy of consideration. T. G. T.

The School, an Introduction to Education. By J. J. FINDLAY, M.A., Ph.D. Home University Library. Williams & Norgate. Pp. 256. 1*s.* net.

Prof. Findlay's general position appears to be as follows: Man is dependent upon schooling for his abilities to adjust himself to environment, so that his development depends upon education; and, therefore, the peculiar function of the professional teacher is to be a student of a growing organism, and to bring all the resources of science to bear upon the problems of its growth and change. "The heart of this book," he says, "is to be found in Chapter V." Chapter V. deals with "Stages of Growth (or Development)," and is, in effect, a short summary of modern views on the development of instincts. The ten chapters of the book have as titles: "Origins," "The Young Man," "The Rise of Educational Institutions," "The Function of the School," "Stages of Growth (or Development)," "The Organization of Education," "Types of School—with Some Reference to Universities," "The Teacher," "The Pursuits of the School," "The Corporate Life of the School."

The space at our disposal does not permit of detailed criticism, and we must

content ourselves by saying that the book is decidedly interesting, provocative of criticism, and encyclopædic in the issues and theories which it touches.

School Visits and Journeys, their Value and their Practice in Education. By HORACE PIGGOTT, M.A., Ph.D. J. M. Dent & Sons. Pp. vi., 96. 1*s*.

This is one of "The 'Educational Journey' Series," of which Dr. Piggott is the general editor. The standpoint is that the value of books in the real education of a child "stands to him in direct relation to his experience in life. To make this rich and round and full is one of the problems of education, as it should be an ambition of life. Educational journeys are here presented as a valuable means to this end." The subject is treated under these headings: "The Place of Personal Experience in Education," "School Journeys as a Means of Education," "Visits and Journeys—Some Characteristics and Differences," "Organization," "Preparation in School," "The Journey—and After," "Ultimate Values of School Journeys." There is an appendix giving the contents of the various books in the series.

This is an excellent little book, and can be strongly recommended to all teachers. It sets forth the educational principles clearly, and gives first-rate practical advice for carrying out journeys.

La Revue Psychologie. September, 1911. Misch & Thron, Brussels. 10 fr. per ann.

In this issue appear the opening discourses of the Congress on Paidology held last year in Brussels, the volumes of reports of which have not yet been issued to subscribers. From the same congress comes an article on "The Moral Influence of Llöyd," very appreciative of the method and of its founder, and detailing how, under the personal observation of the writer, children had been influenced for good by their work. To this issue also Prof. Bachterew of St. Petersburg gives a thoughtful discourse on "Social Psychology," urging that many earlier writers, as Tarde and Lebon, have approached the subject from too subjective a standpoint; that even Wundt, in his "Volkerpsychologie," has not reached the best point of view; and that the need is for a more objective treatment, and a closer consideration of the reaction of social groups. This article would well repay further consideration.

T. G. T.

L'Educateur Moderne. January, February, March, 1912. Paulin, Paris.

In these three issues the most notable articles, from our point of view, are those in January and March, by M. Comfayré, on "Froebel," in continuation of two in October and November. This series of four articles, a general *résumé* of Froebel's teaching, with some account of modern tendencies and developments, is well worth consideration; in France, where there has of late been a revival of interest in the kindergarten system, it is opportune. In the January issue Dr. Laurent gives a *résumé* of the proceedings at Lyons of the section on abnormal children of the French Medical Congress, the questions considered being the need of boarding schools and the value of manual occupations for abnormal children. In the same issue Mme. Moll-Weiss gives an all too brief account of visits she paid to Froebelien schools in Dresden and Berlin, and Mme. de la Chapelle a warm appreciation of what she saw at the Birley House School, Forest Hill.

M. Roger Cousinet, like may other people, has slight belief in the educational value of dictation, and deals ironically with the subject in the February issue, wherein also appears a philosophical, if not quite convincing, article on the "Child's Idea of Justice," whilst the figures provided by M. Friedel in dealing with the payment of teachers in various European countries afford some interesting comparisons, though Great Britain receives inadequate treatment. T. G. T.

Archives de Psychologie. November, 1911. Williams & Norgate. Pp. 96. 3 fr. 25.

In the *Archives* for August, 1906, appeared a criticism of the Binet-Simon Tests of Intelligence, by Dr. Decroly and Mlle. Degand, which is still one of the standard pieces of work upon this topic; in this issue appears a less exhaustive but skilful examination of these tests in their application to twenty-four children, by Mlle. A. Descœudres. She concludes that the tests for children of 7–8 years, whilst they show clearly the difference between the good and bad pupils, are too easy, since a normal child of seven should be able to do those set for children of eight years; that the tests for 9–10 years are less characteristic, whilst those for 11–12 years, whilst marking the differences between pupils less clearly than the earlier tests, are somewhat too difficult. The same writer also gives an account of some further tests she has tried, at the suggestion of Prof. Claparède, on fourteen backward and abnormal children, with their results. Together, these two articles form a valuable contribution to an important subject. This issue also contains an appreciative review of the work of the late Alfred Binet by Prof. Claparède. T. G. T.

Bulletin de l'Education Morale de la Jeunesse. January–March, 1912. Paris: 81, rue Darean. 16–20 pp. 50 centimes.

This useful little publication, deeply interested in moral training, and of late an exponent of the methods of Mme. Montessori, contains much of interest to lovers of children. Its appeal is rather to parents than to teachers. In the January issue is a short article urging that little children should not be too carefully guarded from exerting their physical strength by over-anxious relatives; in the March number appear two contributions, one on the means of preventing children from becoming afraid of the dark, the other on school hygiene, dealing with the elements of the subject, and promising more. It is interesting to note that at the "Maison des Enfants," in the avenue du Général Tripier, a school recently opened on Montessori lines, and presided over by Mme. Prigol, a series of meetings of mothers has been arranged for the study of experimental psychology and scientific pedagogy. This is certainly a hopeful departure; may it succeed and others follow; perhaps some British mothers—not to mention fathers—might profit by a similar course.

T. G. T.

Publications Received.—*Journal of Education; Journal of Experimental Pedagogy; Educational Times; Child Life; Parents' Review; Educational Review* (U.S.A.); *The Pedagogical Seminary* (U.S.A.); *The Training School* (U.S.A.); *Archives de Psychologie; L'Education Familiale; School Hygiene; The Nature Reader*, Monthly, by F. H. Shoosmith, B.Sc.; *The Teaching of English Analysis*, by E. M. Dobbs, M.A.

Vol. 5.—No. 2. JULY, 1912.

Child-Study.

The Journal of the Child-Study Society.

MEASUREMENT IN CHILD STUDY.

By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

Being the Presidential Address to the Conference of the Child-Study Society, London, May 9, 10, *and* 11, 1912.

The wisdom of Frœbel's words: "Lasst uns unseren Kindern leben!"—"Let us live with our children"—is fully appreciated by the Child-Study Society, which has, however, advanced upon that, and realized that we must not only live with them and love them, but make them the subject of scientific observation and experiment, if we would fully discharge our obligations to them. The Society has come into existence to collect and analyze the crude and fragmentary and not always impartial records of the domestic circle, to digest the wider but still restricted experiences of the school, and to initiate such inquiries as may throw light on child-nature, and, therefore, as embryology has done, illuminate the whole history of man. It has already achieved useful results and exerted a wholesome influence on teachers and parents and on the public too, for I do not doubt that the reports of its proceedings, trickling through the press, have promoted that periodical medical examination of children in elementary schools now happily established, which I hope to see one of these days extended to schools of all classes and even to the home, for I cannot conceive any better or more economical scheme of National Life Insurance than that which secures the conservation of the health of the rising generation, and the early detection and efficient treatment of those diseases and defects which, left unheeded, help to pile up that enormous and grievous load of degeneracy of many different kinds under which this country groans and for which it has to pay. *Principiis obstat.*

Thanks, I believe, in some measure to the operations of this Society, we are slowly outgrowing the notion that the child is like a lump of clay in the potter's hand and can be moulded at pleasure. We are beginning

to understand that each child is a specific entity—a little hide-bound bundle of living possibilities, good and bad, and that if we would evoke the one and repress the other, our education and training must be individual and not in the gross. We are beginning to perceive that the phenomena of child life must be noted and arranged in their invariable relations of succession and similitude if we are to discover their scientific meaning and practical significance. We are beginning to comprehend that certain manifestations of wickedness and contrariety in the child are sometimes due to original sin in the sense of some fault of organization, not amenable to discipline or punishment, but requiring segregation, or to the effects of a temporary inroad of some ill-disposed microbes to be corrected by vaccine-therapy. We are beginning to recognize that the mother and the father and the teacher and the physician must all co-operate if the twentieth-century child is to be emancipated from crippling traditional bonds, to exchange dull drudgery for delightful spontaneity, and to attain the full stature of mind and body to which its inherited proclivities entitle it.

The investigations of the members of the Society have already covered an extensive field; the papers read before it have opened up many new lines of research, and in delivering my third address as your President, as I have the honour to do this evening, I am puzzled to find any new thing to say to you, any topic in connection with child-study, within my own ken, which has not already engaged your attention, and been discussed by experts. I trust, therefore, you will bear with me if, driven by stress of forestalment, and desiring to avoid the seductive but unremunerative regions of pure speculation, I merely point out to you certain seams of child-study still comparatively unexplored, into which new shafts may profitably be sunk, and illustrate by means of one or two examples the utility of accurate measurement, physical and psychical, during the growth of the child.

And, first, let me allude to an interesting and promising branch of child study still much in need of elucidation—that which relates to the order of development of sex differences and characteristics, mental and corporeal. From the moment of the fertilization of the germ when sex is determined, divergence in structure and function goes on until maturity is reached, and a just comprehension of the extent, progress and limits of that divergence is essential to the wise regulation of education and of social life.

The gradual mental divergence of the boy and the girl is an object of daily observation in every family circle, and in every seminary for the young, and asserts itself from time to time in salient ways. Thackeray said that little girls make love in the nursery, and practise the arts of

coquetry on the page-boy who brings the coals upstairs, and as for the page-boy, his pugnacious propensities are already fully developed and have probably brought him into conflict with his brother buttons. But notwithstanding the saliency and universality of the mental difference between boys and girls, these are still imperfectly understood, and in this, as in so many other problems of nature, the greater our knowledge grows the clearer becomes our vision of the difficulties and complexities of a final scientific explanation. The differences in mental constitution between boys and girls observed, and often very imperfectly observed, cannot be correctly interpreted from any purely psychological point of view. When that eccentric father of a family of geniuses, the Rev. Mr. Brontë, of Haworth, desiring that his children should speak freely and without timidity, put them behind a mask and interrogated them on various subjects, he was told by his son Branwell, then seven years old, in answer to one of his questions, that the best way of knowing the difference between the intellects of men and women is by considering the difference between them as to their bodies. The deliverance of the precocious boy seemed to his father at the time, a wise saying, worthy of being recorded, but it is incontestable that there are now large numbers of cultivated people to whom it must sound as foolishness, and a mere infantile echo of a barbarous prejudice, the absolute intellectual equality of the sexes, under free economical, social and political conditions, being regarded, notwithstanding some somatic differences, as as well assured as the equality in physical energy of two forty horse-power motor-cars although of different make and pattern. And yet few medical men will doubt that Master Branwell Brontë was quite right, and that it is in structural modifications and changes that the meaning of the unquestionably diverse intellectual powers and capacities of the two sexes must be sought out.

To catalogue in the briefest way the bodily differences between the male and the female which underlie their intellectual disparities would be to exhaust the time at my disposal. They are universal and intimate, and involve every organ and tissue. They extend from cuticular appendages to the marrow of the bones, from the crown of the head—for, according to Broca, the female cranium is less elevated than that of the male—to the sole of the foot—for, according to Delauncey, woman has a plantar arch flatter than that of man,—which perhaps accounts for her partiality for high-heeled boots. It is, of course, in the brain that the immediate substratum of mental sex differences must be sought, and although prolonged exploration is still necessary to explicate the stratification and cleavage of that substratum, indications are not now wanting that it is differently organized in the two sexes;

and hopes may be entertained that we shall yet be able to recognize in it histological differences in structure corresponding with the markedly different epochs of mental evolution in boys and girls.

Fleshig, observing that in the embryo the nerve fibres first formed are naked or have no myelin or insulating sheaths, and justifiably assuming that the formation of these easily detected coverings marks the completed structure of the nerve fibre, and the time of its entrance on functional activity, has shown that the different areas of the cortex of the brain come into operation at different periods of intra- and extra-uterine life. The first areas to become myelinated are the primary sense centres for smell, cutaneous and muscle sense, sight, hearing, and touch, and later, in connection with these centres, myelinization of the tracts of motor fibres is observed. There are thus formed seven primary zones in the brain, sensory and motor, called projection areas, because they are the foci of the out-going and incoming nerve fibres which connect the cortex of the brain with the underlying parts of the nervous system, and outside these primary zones are gradually developed marginal or border zones, which have no projection fibres but are connected by short linking fibres with the primary projection areas. These areas all develop after birth. We can actually see the budding of the brain and the putting forth of the binding withes, and these may together be regarded as the seat of organized memories connected with the primary sense centres.

But the projection or motor and sense areas and marginal zones in the brain occupy only a small portion of its surface; forming islands surrounded by much more extensive and still almost unexplored tracts. These are the association centres in which all the higher and more complex mental activities are mediated, the regions in which the different sense impressions are synthesized, into complex perceptions or concepts. These association centres are connected by bands of nerve-fibres, with the various sensory centres into which are gathered up all the impressions poured in through the avenues of the senses, and thus the mechanism is provided by which the impressions from these separate sense centres may be sorted and combined in consciousness to form a mental image of a complex kind. In these association centres the orderly sequence of phenomena in the external world is reflected in an orderly way, and records of past experiences are laid down and classified and made reproducible by some as yet unknown change in galaxies of cells and networks of fibres.

In these association areas, four in number, changes in structure and function in the direction of evolution proceed until maturity is reached and dissolution sets in. No doubt in the sensory and motor centres

elaboration of structure and improvement of function, go on long after the myelinization of the fibres connected with them is complete, for the highest acuity of the several senses and the highest voluntary control over the muscles are only gradually acquired during infancy and childhood, but it is in the association centres that educability is retained until middle life, if not later. The efficiency of their performance in some directions may be increased by exercise and training even during senescence, but the power of exercise and training at all ages is strictly limited by the inborn character of the organization, and by certain laws of growth. The cells of the cerebrum have their individual heredity, and can only be influenced within a narrow range by the environment, which sense impression, exercise and training and the blood provide for them, and there is probably localization of function within the association centres, as well as in the brain as a whole. And part of the inexorable heredity of the cells of these association centres, in which the highest mental processes are mediated, is a sex habit which no exercise or training can obviate, and which is also probably reflected in differences in localization within the association areas in the male and female respectively. Every organ in the body is represented in the brain, and it is impossible to doubt that the representation is just and proportionate, and that the congeries of cerebral centres above repeats every distinctive feature and function in the congeries of bodily organs below. Knowing as we do that different parts of the cerebral cortex give different reactions in consciousness, we are satisfied that special talents in individuals are due to differences in organization of special parts of the cortex, and *à fortiori* it would seem that the broad mental differences between men and women must have differences in cerebral organization underlying them. What these differences in cerebral organizations are we do not fully know, for, apart from a guess founded on size, no anatomist could say positively whether a brain submitted to him was male or female, but it may be hoped that in time these differences—differences, perhaps, in convolutional arrangement and cortical lamination in different regions—will be made out, and it is, perhaps, in the close observation of the emergence of the mental differences of sex in connection with cerebral development that a clue to their localization may be obtained, and a trustworthy scheme prepared of the distribution of the higher psychical activities in the cerebral cortex. The order of appearance of sexual mental differences and the age periods at which they present themselves are questions of great practical importance, for it is during its nascent or growth period that every cerebral centre is most amenable to discipline and most powerfully influenced by exercise and training.

There is one well-established physiological difference between men and women that must not be lost sight of in connection with cerebral activity, and that is the composition of the blood. The fact may not, perhaps, be palatable to some uncompromising advocates of women's rights, but it is a fact that there is a marked difference in the blood of the two sexes. The red corpuscles of the blood whose function, speaking generally, is to carry oxygen from the lungs to the tissues, average in number 5,000,000 per cubic micro-millimetre of blood in the adult male, and 4,500,000 per cubic micro-millimetre in the adult female. The blood of the adult male is, therefore, ten per cent. richer in red blood corpuscles than the blood of the adult female. The number of these red corpuscles of the blood no doubt varies greatly under different conditions. It varies in individuals, with states of nutrition and modes of life, and even with the time of day, showing a distinct diminution after meals: it varies in pathological states, being reduced to an extreme degree in anæmia; and it varies in accordance with geographical position, being sometimes increased in those who live at very high altitudes (10,000 feet) from 5 up to 7 or even 8 million per cubic micro-millimetre. The reaction under these circumstances begins very quickly, within twenty-four hours according to some observers, and even in less time according to others who have experimented in balloon ascents, but in whatever time established, it is clearly an adaptation by which, by means of an increased number of corpuscles, the oxygen carrying capacity of the blood is raised to compensate for the diminished amount of oxygen in the air. We shall await with curiosity blood counts in the case of our adventurous aviators.

But all the variations in the number of the blood corpuscles, that take place under varying conditions, only emphasize the importance of the part they play as the carriers of that hæmoglobin which combines with the oxygen of the air in the lungs to form oxyhæmoglobin, from which the tissues, and the brain tissues amongst them, take the respiratory oxygen. According to Preyer, the average amount of hæmoglobin for the adult male is 14 grams to each 100 grams of blood, and it is estimated that in the blood of a man weighing 12 stone, there are contained about 500 or 700 grams of hæmoglobin, which is distributed in 25,000,000,000 of corpuscles, giving a total superficial area of 3200 square metres. Practically all this large surface of hæmoglobin is available for the absorption of the oxygen from the air in the lungs, for, owing to the great number and minute size of the capillaries, the blood, in passing through a capillary area, becomes subdivided to such an extent that the red corpuscles stream through the capillaries in single file. This is especially the case in the lungs and brain, in which the

capillaries are very fine, and thus in streaming through the lungs each corpuscle becomes exposed to the action of the air, and the utilization of the entire quantity of hæmoglobin present is almost perfect. We are too apt, however, to concentrate our attention on the mere respiratory history of oxygen as taken up by the red corpuscles, but it is to be borne in mind that oxygen, after it has reached the tissues, participates in the chemical changes of the organism and forms an integral part of nutritional processes. It takes an important part in the changes that occur in foodstuffs from the time that they are absorbed from the alimentary canal until they are eliminated in the excretions. The presence, therefore, in the blood of the adult male of ten per cent. more hæmoglobin than exists in the blood of the adult female, must mean some difference in the quantity and quality of tissue metabolism, and therefore of brain metabolism in the two cases, and it becomes important to determine whether the same difference in the composition of the blood that exists in the adult exists in early life when growth is going on and at what age it is established. It does not exist in early infancy. In one case in which an observation was made at an early stage of embryonic life, the red corpuscles were found to number only 3·3 million per cubic micro-millimetre. For the first few days after birth their number seems to be excessive, but in about a fortnight the normal is reached and the number is the same for both sexes and remains so during infancy. As beyond that age I could find no observations on the point, I resolved to make some for myself.

With the kind assistance of Dr. Kimmins, Chief of the Education Department of the London County Council, and of Mr. Restall and Miss Lacy, head master and head mistress of the Elementary School at Wild Street, Holborn, ten boys and ten girls of twelve years of age were selected, all normal, in good health, and of average bodily and mental vigour, and specimens of their blood were taken. The specimens were collected at eleven o'clock forenoon, and the counts were carried out with the most scrupulous care. The result arrived at is, that at twelve years of age the number of red corpuscles is considerably greater in girls than in boys—the average for the girls being 4·830 million per cubic micro-millimetre, against an average of 4·603 for the boys.

The counts in the case of the boys are remarkably uniform. With the exception of one boy, who showed 5·30 red corpuscles per cubic micro-millimetre, and who is reported to be a singularly sturdy, fit, strong, and vigorous little fellow, always in the pink of condition, all the others ranged between 4·15 and 4·98, and in five cases the range was between 4·40 and 4·60. Boys therefore, at twelve years of age, have blood of the pre-sexual or feminine type, and give no indication

of prepubertal disturbance. But with girls of twelve, the case is very different. In them the fluctuations in the number of the red blood corpuscles is much greater than in boys, ranging, in my observations, from 3·95 to 5·85 per cubic micro-millimetre, while the average number present is in excess of that in the adult woman, being 4·830 against 4·500. In four of the girls examined the number of red corpuscles actually exceeded that of the adult man. In one the number was exceptionally low, only 3·95, and this girl, as I have since ascertained from Miss Lacy, had had an operation at the back of her nose recently and was at times short of food, so that she should perhaps scarcely have been admitted to a healthy group. Another girl who gave a low count, 4·10, proved to be of Italian parentage and has been headachy and out of sorts since an attack of influenza. Leaving out of account these two girls, the average number of red blood corpuscles for the other eight would have been above the adult male average of 5,000,000. It is clear that girls at twelve years of age have already entered on the prepubertal stage of accelerated physiological activity when rapid constitutional changes are going on and when there is a demand for rich blood.

The blood counts in girls and boys at this epoch of life closely correspond with what we know of their rates of growth. The yearly percentage increment in weight, according to Donaldson's tables, is from ten to eleven years of age, practically the same for both sexes, being 11·6 for boys and 11·4 for girls, but in the following year, eleven to twelve, a marked difference declares itself, the percentage increment for boys being 6·5 and for girls 9·9. In the following year, twelve to thirteen, the difference is still more conspicuous, the percentage increment being 7·1 for boys and 11·9 for girls. Next year, thirteen to fourteen, the maximum difference is reached, the percentage increment for boys being 7·8, and for girls 14·4, or just double. After that the boys forge ahead, while the girls, having exhausted their special spurt of growth energy, fall behind. From fourteen to fifteen years of age the boys show a percentage increment of weight of 11·0 against 10·8 for the girls, and from fifteen to sixteen the boys' percentage is 15·7 against 9·8 for girls.

As regards height, girls show a greater annual increase than boys from the eleventh to the fourteenth year of life, when boys again take the lead. Between eleven and fifteen years of age the average English girl is heavier and taller than the average English boy, and, in her, constitutional changes come earlier than they do in him and are of more serious physiological import. To support these constitutional changes there is a more active hæmatopoiesis, as it is called, or production of red corpuscles in the bone marrow, the spleen and lymphatics than at

any other period of life. This active production of red blood corpuscles in the female goes on for three or four years, but gradually subsides during adolescence, and at nineteen to twenty years of age the relative composition of the blood of the female becomes what it afterwards remains throughout life while health is maintained.

Again, through the kindness of Dr. Kimmins, I have had the blood examined of twenty healthy normal young men and young women—ten males and ten females, of twenty years of age, students at the Goldsmith's Institute, New Cross—and the number of red corpuscles in them reaches exactly the adult sex averages. The average for the man is 5·009, that for the woman 4·4800. The range of variation in individual cases is again greater in the females than in the males, showing as indeed other physiological and pathological conditions indicate, that the blood-forming tissues in the female are more unstable than in the male, and much more susceptible to constitutional and external influences. The transition from the infantine to the adult blood type is steady and gradual in the male; in the female it is abrupt and subject to violent disturbances. Girls are, of course, liable to anæmia at the rapid growth period in a far larger proportion than boys, and in them the anæmia sometimes assumes the extreme form of chlorosis, in some cases of which the blood count falls to under one million corpuscles per cubic micro-millimetre. In chlorosis, the chief feature of which is diminution of the amount of hæmoglobin, the blood count in a large number of cases has averaged about four million, a reduction below the adult female average of four million five hundred thousand, which seems small considering the gravity of the symptoms, but the reduction is really much greater than that, for I have now shown that the average blood count in girls at the growth period should be five million, and the diminution to four million in chlorosis really means a reduction of two tenths.

The blood counts in girls at the rapid growth period, when momentous changes are taking place in body and mind, seem to me of great significance, and must be well weighed in connection with our educational arrangements. Marked cases of anæmia are recognized and treated, but there is a large amount of slight anæmia about that escapes detection. Girls grow sluggish in their work and are pronounced lazy, or they look pale and are urged to more active outdoor exercise, but all the time it is poverty of the blood that is at fault, and that will not be relieved by tutorial monitions or violent hockey. I cannot enter here on the etiology of the anæmia of girlhood, but I would say in passing that one prolific cause of it is what I have called *anorexia scholastica*, that loss of appetite with impaired digestion so

often seen in these days in eager and overworked schoolgirls, a loss of appetite that will certainly not be remedied by muscular exercise, for as Sir Lauder Brunton has said, "when overstrain of the muscles is added to overstrain of the brain the stomach strikes work, digestion is spoilt, and indisposition ensues."

(*To be continued.*)

THE INFLUENCE OF DEFECTS OF HEARING IN RELATION TO THE MENTAL AND PHYSICAL DEVELOPMENT OF THE CHILD.

By JAMES KERR LOVE, M.D.

A Paper read at Conference of the Child-Study Society, held in the University of London, Friday, May 10, 1912.

Introductory.—The title of this paper at once raises the question of the relative importances of the senses in the education of the child. I use the word "education" as embracing mental and physical development, and in order to limit this paper I exclude the senses of taste and smell because they are seldom perverted in children and because deliberate attempts to educate them do not form any large part of the training of children. Of the remaining senses one is tempted to exclude touch also, and to deal only with sight and hearing, the two great gateways of knowledge used in education. But touch is more important than at first sight appears, for whenever sight or hearing becomes impaired, it is raised to the first rank as a means of education.

The Sense of Touch.—The information which reaches the individual through the sense of touch is much more extensive than we commonly think. By touch we know the position the tongue must occupy for the articulation of words, the position of a bolus of food during mastication and preparatory to swallowing. The sense of touch in the fingers tells of the smoothness or roughness, the hardness or softness of surfaces. By sight alone one cannot tell whether the edge of a knife or the point of a needle is sharp. The real quality of the edge or the point has to be tested by the sense of touch. But the sense is not confined to the tongue and fingers. We are sure of the ground we tread on by the sense of touch, and when this becomes impaired, as in locomotor ataxy, the gait becomes awkward in spite of the presence of the senses of sight and hearing. The sense of touch is the most widely distributed in the body, it is universal on the skin surface, and much of the exhilaration of

a walk in the open air comes from the effect of the wind and the sun on the sense of touch.

The value of the senses of touch is best appreciated by, and its power most developed in, the blind and deaf. In Helen Keller's book, "The World I Live in," the power of touch is finely portrayed. Here a single sense greatly developed and carefully used is made to guide a deaf and blind girl amongst mysteries of a world which is mysterious to thinking persons provided with all five senses.

The range of the sense of touch is more limited than those of sight and hearing, but within its own sphere the information is more accurate than that reaching the individual by any other channel. The sense is seldom perverted in young children, and is the last and only resort in the education of those who are both blind and deaf.

The Sense of Sight.—For several reasons the sense of sight has been exalted to the premier position amongst the five senses. The spectacle of a blind man always moves to pity to a greater extent than does the meeting with a deaf man. The joy got from broad patches of colour, from variety in shape, from beauty of form, and from the appreciation of perspective is a joy we feel we would almost die rather than do without. And yet if we exclude the special use we make of sight in reading, it is astonishing how little accurate information the average man gets through the sense of sight. When he returns from a function he can seldom tell his wife what Lady So-and-so or Mrs. Blank had on, even to the colour of her dress. And few of us, whether man or woman, could name ten articles out of a hundred occupying a shop window at which we had spent five or ten minutes. No doubt the power of observation in which the eye plays so large a part varies with the individual, and is capable of great development in all, but, speaking generally, the impressions reaching us through the sense of sight are general and broad rather than detailed.

The Sense of Hearing.—The acquisition of speech by man has made the sense of hearing *facile princeps* the educational sense. Strike a child blind and you can carry on his education without any profound alteration in method. Strike him deaf and all your methods have to be radically altered. I am here speaking of the young child. In a letter to the writer, Helen Keller puts this better than it has ever been put.

"The problems of deafness are deeper and more complex if not more important than those of blindness. Deafness is a much worse misfortune. For it means the loss of the most vital stimulus, the sound of the voice, that brings language, sets thought astir, and keeps us in the intellectual company of man."

We are thus led to consider the influences of loss of hearing on the

mental and physical development of the child. I assume the very young child is meant here. It is during the very early years of life that both mental and physical development are most rapid. By contrast, the difference between a child at birth and a child at six or seven years when he enters an elementary school, is far greater than during any equal subsequent period in the life of the individual. At birth there is neither sight nor hearing, and all movements are the result of reflex action, without purpose or intent. At seven years the child has been transformed. Alert, rapid and accurate in every movement, quick of ear and eye, a great imitator, able to receive and to express thought, in possession of a vocabulary sufficient for all the real needs of living, the child has been undergoing a process of education at a rate with which all the progress of the schools is slow. The great instrument in this progress is the acquisition of language, and in the hearing child this language is speech. Writing, a much later form of language, both in the history of the race and of the individual, has not yet been taught the child. But he talks constantly to his father or his mother or his little fellows, if they be near: the girl to her doll, the boy to his teddy bear or his tin soldier, if there be no other company. He is a great questioner, and the average father or mother is a fine teacher. With the notion that the little boy or girl is the finest of his race ever born, with a method so correct that modern schoolmasters have adopted "the mother's method" of teaching language, no wonder progress is rapid. For thousands of years heredity has been shaping the mother efforts to the needs of the young child, and teachers do well not to remove the child too soon from the control of the mother, and to follow her methods in subsequent education.

But when deafness sets in, or, worse still, when the child is born deaf, this born teacher, the mother, loses all her bearings. Try for a moment to put yourself in the position of a mother who, say, when her child reaches the age of eighteen months, is faced with the terrible discovery that her little one is deaf. The child has not begun to speak. She has been accustomed to hold out her arms, and the child has responded by burying its head in her bosom, the smile and the frown and other simple natural signs and gestures have been common to them. But the spoken word has never come; and the spoken word must come if thought is to develop. Writing and finger spelling cannot be taught at this age, and signs and gestures will not carry the child into the region of accurate thinking. Nothing but the word will do. The mother is an expert with the word; but without hearing the child can make nothing of the word, and at this age the production of the word by the imitation of muscular movements as seen on the face, tongue,

and lips is not possible. How would you, in these circumstances, teach the child the word "dog"? Your bow-wow which would be heard by the blind child, and recognized as like the bark of the dog, means nothing to the deaf child, and you have no terms by which to convey the idea of roughness or smoothness as applied to the coat of the dog. Now, the teachers of the deaf will tell you how they do this. My present purpose is to point out that absence or great defect of hearing arrests mental progress, and that at eighteen months a deaf child begins a period of intellectual stasis which extends to the age of seven years, when he enters school. The physical counterpart of this intellectual stasis is that the deaf child at seven years has a smaller brain than the hearing child of the same age.

The second effect which deafness has on the mental development of the child relates to the nature of his thought processes. Most of us think in whole words as we have heard them spoken. The deaf child must think in something he has seen: the printed word, the picture of an object or action, or perhaps in a few cases in muscular movements which he himself has made in producing words. I have often noticed, in giving quite simple arithmetic tests to the upper classes in schools for the deaf, a curious hesitancy or slowness to understand the problem. This could not be explained by the intrinsic difficulty of the problem, because the arithmetical attainments of the class were far above the question involved. I believe it comes from the fact that our senses supplement one another in expediting thought processes, and that the absence of hearing, on which thought processes so much depend, finds no adequate compensation by increased activity of the other senses.

Hence thought processes in the deaf are slower than in the hearing. Deaf-mutes are seldom great readers. On the other hand, they play cricket well, a team of deaf hockey players or of deaf football players cannot be known by any inferiority in their play, and often beat a corresponding team of hearing boys or girls. Deaf boys swim as well as hearing boys, they run as fast, they make excellent handicraftsmen. Wherever hand and eye, muscle and bone, tendon and nerve, are the chief factors which make for success the deaf are equal to the hearing; but without the great cortical centre which governs the sense of hearing and which links sound to muscular movement by the spoken word, thought processes are slower. The presence of even some hearing, as in the semi-deaf, or of some remains of unforgotten speech, as in the semi-mute, makes the deaf child an auditive, like the hearing child, and vestiges of speech and hearing become valuable assets in education. These considerations do not establish any mental deficiency amongst deaf children. They are, rather, statements of mental

obstacles or difficulties, centreing round the acquisition of language. Were attempts made to use the five years which are now lost to deaf children, the years from two to seven, and were the education of deaf children carried on till eighteen instead of sixteen years as at present, they would leave school with much better speech, with a command of language comparable to that of the hearing child, with a power to read newspapers and books which they now seldom open, and consequently with a widened interest in life and a greater efficiency as citizens. Deafness and mental deficiency cannot be too thoroughly dissociated. Mentally defected children occur amongst deaf children as they do amongst hearing children. But the mental effect is due to a disease like meningitis which has caused the deafness, and the ravages of which have not been confined to the ear or the hearing centres. Or it may be due to degenerative changes involving the whole brain and including the hearing centres, as I think it often is in sporadic congenital deafness. There is an impression amongst teachers that children who are hereditarily deaf children, who have deaf relatives either in the direct line or in collateral branches of the family, are seldom mentally defective. I have collected opinions and figures on this point which I hope to speak of on an early occasion. My object here is to show that deafness in itself is not a cause of mental deficiency, that education is quite equal to the task of equipping the deaf child mentally, and that when deafness is associated with mental deficiency it is a concomitant and not a cause.

The preceding remarks apply chiefly to true deaf-mute children. When hearing is present for the louder voice sounds, a kind of vocabulary is got by the child, and if individual attention be given to the child, educational progress is attained at a fairly normal rate. In an elementary school, however, such a child makes little more progress than a deaf-mute child does. These are the semi-deaf children for whom provision is now only beginning to be made.

When deafness comes on at four or six years of age, and when it is complete, dumbness follows. Without special teaching this occurs in a few months. With special teaching, not only may it not occur, but even when speech is lost the latter may be resurrected. Although the art of speaking has gone, the memory of words has not been obliterated, and it is easier to revive the lip and tongue movements which produce speech than it is to create them in a deaf-born child.

Two interesting features are noticed in dealing with these children. The commoner one is that if they be left in an elementary school, progress becomes almost quite arrested, and though under the present arrangements such children are passed on from standard to standard as

the years pass, one finds them at twelve and fourteen years with the educational accomplishments of just half that age, six or seven years, the age at which such deafness usually comes on. The second feature is rather uncommon and consists of the parrotting of words and sentences. A semi-deaf boy with a quick eye picks up partly by hearing and partly by lip-reading snatches of what is taught, and I have heard such a boy recite a verse or sing a song correctly in tune, not a word of which he understood. These semi-deaf and semi-mute children when removed to special schools make very rapid educational progress, and are themselves greatly delighted with the educational change.

Nearly twenty years ago I showed that deaf children who were plainly fed and clothed and who were reared in the really good hygienic conditions which obtain in most of our Institutions for the Deaf, were not inferior to hearing children in physique. Weight, stature, and chest measurement were shown to be as good as in middle-class elementary schools. I do not recognize, therefore, that deafness in itself militates against good physical development. The chief physical change or difference between hearing and deaf children is the slightly less head measurement of the latter, due, I think, to neglect of them during the period of language formation. When deaf children are physically defective, the defect is not due to the deafness; the deafness and the defect are both due to a common cause. Deaf children seem to me to have a greater tendency to adenoid growths of the naso-pharynx than hearing children, and when one considers the less use made of the muscles of the palate and pharynx in deaf children, this result is partly explained.

The suggestions which grow out of these considerations on defects of hearing are, I think, these:—

1. Young deaf children should commence some kind of language training at three years of age or as soon as the fact of deafness is discovered.

2. The school period in schools for the deaf should be extended to eighteen years of age.

3. Every effort should be made to use the remaining speech and hearing of deaf children, and the semi-deaf and semi-mute should attend special schools from which the true deaf and dumb should be excluded.

THE INFLUENCE OF DEFECTS OF VISION IN RELATION TO THE MENTAL AND PHYSICAL DEVELOPMENT OF THE CHILD.

By N. BISHOP HARMAN, M.A., M.B., Cantab, F.R.C.S.

Assistant Ophthalmic Surgeon West London Hospital, Oculist London County Council Schools.

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The influence of defects of vision upon the mental and physical development of the child can be best judged of by taking extreme cases. First let us consider what influence vision has had upon the mental and physical development of man; secondly, what influence is exerted by the loss of sight.

The first of these propositions—the influence of vision upon the development of man—is one of the most interesting pieces of morphology that can be contemplated. Why has man assumed an upright position? Why has the snout vanished and a fair, round, flattened face taken its place? The answer is, all these radical changes in the conformation of man have been the result of a steady progression towards perfection in the organs of vision.

Man now lives by his eyes, he relies upon his sight more than upon any other of his senses. The form, the colour, the size, and the distance of objects are all measures that he is constantly taking by means of his eyes. He fills his memory with living pictures; remembrance is the revivifying of pictures once seen by his eyes, or of pictures conceived by an imagination fed upon visual impressions.

The growth and perfection of binocular vision, a faculty which greatly increases the judgment of form, and by which almost alone we judge of the size or distance of objects, is eloquent testimony to the important part that sight plays in the mentality of man. The senses of touch, smell, and hearing are admirable possessions, indispensable truly to the whole man, but they are not the first line of sensation of a man. With other animals it is different. The dog stores his mind with the remembrance of smells, the horse with the recollection of sounds; the dog smells out the object of his search, and is at a loss to recognize his master when to windward of him. The horse recognizes familiar voices, he is terrified at unknown and sudden noises, but can find his way in the dark by the judgment of the sounds of the road when his master is quite at a loss for his position.

Man wants to see, then he feels he knows; the experience has passed into a proverb. "Seeing is believing."

So much for the pre-eminence of vision as the organ of sense in man. Now consider the condition of those whose sight has been lost.

When that loss has taken place in infancy the influence is profound. In earlier days so hopeless was the lot of such that the "poor blind beggar" was a familiar object. To-day the excellence of the modern training of the blind has done away with the beggar, but any teacher of the blind will tell you of the difficulty of stimulating the remaining sense faculties of these children. Take one point only. Perhaps the most difficult of lessons to teach the blind is "deportment," and particularly facial control. They readily contract habits, various sorts of antics or contortions, and picking at the eyes, all of which are liable to become disgustingly ugly, and which, if carried into adult life, still further handicap the blind in their dealings with normal folk.

The advantages of perfect sight are acknowledged; the grievous handicap of loss of sight obvious. It follows that every sort of defect of vision presents a disadvantage and handicap; according to the degree of that defect so will be the handicap.

To bring the discussion to a focus let us consider briefly the conditions and influences of certain well-known defects of vision. Hypermetropia, astigmatism, and myopia are names well known to you all, no doubt some of you suffer from one or other defect and can remember the subjective symptoms that first called your or your friends' notice to it. The hypermetropic eye is too small an eye, it is short from before backwards, so that parallel rays entering it are not focussed upon the retina. To meet the defect the internal muscles of the eyes contract, and by altering the shape of the lens within the eye focus the rays. When the manner of life is such that sight is in the main of distant objects, across sea and land, this effort of focussing is not serious for young people. But when long hours of close work in school have to be endured, or when ill-health enfeebles muscular power, then trouble is found. Eyeache, headache, blinking, and mental fatigue are complained of; or a cast in the eye, a "squint," with its destructive effect on the precious faculty of binocular vision may appear.

Astigmatism is an even more prolific source of trouble to the school-child. The term means, literally, "that which has no point." The astigmatic eye has no focus under any condition; the rays entering the eye cannot be brought to a point or focus. Nevertheless, the eye is always trying to focus and see clearly, and fatigue is readily induced. Besides, the appearance of objects is distorted, shapes are changed.

One has only to look at the appearance of one's own face in the comic mirrors found at the doors of some cheap eating-houses, and marked "before" and "after" dinner, to appreciate what the distortion of gross astigmatism means. The ill-effects of such a defect of vision are all those caused by hypermetropia, only these effects are more certain to follow. Further, there is another sequela of even more serious import —the induction of myopia or short sight.

When vision is poor, work that has to be seen is held closer to the eyes to increase the relative size of the object of vision. This action necessitates excessive turning in or convergence of the eyes; the movement causes pressure on the globes by the surrounding muscles, and to this pressure I am inclined to attribute the progressive bulging or stretching of the coats of the eye which we call myopia. Once myopia is started, the conditions act and react in a vicious circle; the myopia needs a still closer approximation of the objects of vision, and the ill-effects of undue convergence are increased. This may not be the whole truth of the causation of myopia, but it is a great part of it, and the part we have to bear in mind for practical purposes.

Myopia is one of the products of forcing a raw civilization upon our children. We set them at our things—books, paper, and pencil—at too early an age. And later we are amazed to find their eyes have become permanently attuned to the evil habits we have inculcated. They can no longer see in the distance; the beauties of Nature's wide-open book are blurred to them; they can only see our books. We have made them bookworms and smugs; a pale-faced, hollow-chested, round-shouldered tribe, who feel alive only indoors, and lost on the broad heath. They see men as trees walking, and trees as blurred masses of indistinguishable character, until such time as the defect is noticed, then they go bespectacled, and see all framed in a rim of metal! This is no fancy picture drawn by one whose views are dominated by a prolonged experience of hospital work. This is my observation from an associated work in hospital and in the schools. Let me give you the results of the examination of 1100 London school-children suffering from defective vision (disease excluded). The following were the classes and proportions of defects found :—

Hypermetropia.	Hypermetropic astigmatism.	Mixed astigmatism.	Myopia.	Myopic astigmatism.	Odd eyes.	Totals.
468	315	78	102	115	22	1100
42·55	28·64	7·09	9·27	10·45	2	100

Putting these classes into two groups we get (1) hypermetropia, including hypermetropia astigmatism, 71·19 per cent. of the cases; (2) myopia, including all the rest, 28·1 per cent. These cases represent about 10 per cent. of the school children; so in London about 3 per cent. of elementary scholars suffer from this progressive condition of myopia and all its attendant evils. To combat this condition it has been found necessary in London County Council schools to establish "myope classes," where defective children are taught such script as is necessary to them by blackboard work freearm fashion; whilst the main part of their curriculum is oral teaching and handicraft. I should like to see this rational system of education extended to all infants or children under seven years of age.

This brings me to one of the gravest of all the defects of vision. It is a defect that every one of us has suffered from at one period of life, and it is the defect the condition of which we can take into account with the greatest certainty and greatest measure of success. That defect is—**immaturity**.

The eye of the child is immature, it is growing, and it must be provided for with just as much forethought as the child itself.

I do not doubt you are familiar with the physiology of vision as propounded in our modern text-books. It is a revelation of beauty that cannot fail to impress you. But, if I may venture a criticism upon the manner of that exposition, it would seem that too often the eye is considered as an organ or optical instrument of equal power in every one, barring certain irregularities such as errors of refraction of which I have reminded you, defects of colour vision, and so forth. To start with such an idea is to lay the foundation for a mischievous scheme of education just as much as the conception of our nearer forefathers that the boy was a miniature man, so that the good of the man was also the good of the boy. I want you to grasp, at the outset, the conception of the growing eye. To grasp the idea of the progressive increase of the size and power of the eye, and of the correlated development of the organs of perception and reception, until the full growth of the human visual apparatus is attained, with its marvellously intricate interaction of eye, brain and hand, so that what the eye sees is understood of the brain and translated into the refined and delicate output of the skilled worker. To those of you who are parents there must have come a realization of the immaturity of the eye of the new-born babe. The eye is there, apparently complete in all its parts; to the gross examination of the most skilled microscopist it may seem a perfect eye unto its finest details. But very simple observations will show that the eye of such an infant has precious little vision. It may be a space of many

days or weeks before the infant will notice the stimulation of light, much less recognize the most familiar object of its existence. But gradually the mother finds that it "notices" her, and her heart is doubly warmed towards her babe; and later it distinguishes between its constant guardian and the casual stranger, who is greeted, it may be, with tears and the grimace of unconscious distrust. There are in these things evidence of the inception of the functions of the eye, the growth of vision, that is, eye and brain are beginning to find themselves.

Or again, we may watch the actual growth of the eye. The pigmentation of the iris may be watched, and its alteration witnessed from week to week. The muddy indistinct smoothness of the slatey-blue iris of the new-born may be seen to clear so as to display the delicate superficial tissues of a blue eye; or else we may see the gradual appearance and spread of surface pigment to the complete painting of a brown eye. I might cite further known changes in the size of the cornea and lens, but the instance of pigmentation is enough to support the gradual change from immaturity to maturity.

Or we may watch the appearance of those higher powers of vision which particularly distinguish man from other animals. I mean full binocular and stereoscopic vision. I cannot do better than quote you the terms of an ancient observation recorded in that mine of interest the *Diary of Pepys*. Like most laymen, he delighted in doctors' gossip, and he recorded the following in the narrative of his voyage with Charles II. from France at the Restoration: "At supper the three doctors of physic again in my cabin, when I put Dr. Scarborough in mind of what I heard him say—that children do, in every day's experience, look several ways with both eyes, till custom teaches them otherwise; and that we do now see but with one eye, our eyes looking in parallel lines."

Now these observations of the growth of the eye in babes are but the more striking features of a growth in visual power that continues far into school life, and the whole of this development is dependent upon proper and balanced external stimuli. Contrariwise, a very short disturbance of the normal stimulus of light will arrest the growth of the infant eye; and irregular or too severe or prolonged stimuli to the eye of the school child will tend to the production or accentuation of temporary or permanent defects in visual power. An extreme case will best show what I mean.

The disastrous effects of ophthalmia neonatorum upon the eyes of infants is well known. In many cases the cornea is irreparably damaged, maybe the eye is lost. There are other cases in which the surgeon is called in time to check the disease with little permanent

damage to the cornea; but in later years some of these are found in our blind schools, with eyes that show the least traces of the inflammation, yet with constant nystagmus (a swaying movement of the eyes) and such poor vision as to leave no doubt that the growth of the eye was stopped during that period of intense inflammation. The prolonged closure of the eyes in the early weeks of life, when we expect the final stimulus of light to be sensibly recognized, has deprived the macula or the sensitive spot of the retina with something necessary to its growth—that is, light.

Similarly the improper exercise of the eyes in the growing years of a child, either by reason of bad or excessive light, the use of improper materials, prolonged close work, or of any work at all during conditions of poor health, will account for the onset of asthenopia, squint, myopia, or even of symptoms of mental disorder of a serious sort in those constitutionally predisposed.

To enter into a discussion of these points, which are really the proper ordering of a school and of its curriculum, is beyond the terms of the title of this discussion. But let me say this much, there is no mystery about the matter, there is required only the application of reasonable thought and of common sense. I would commend to your attention in this connection a recent discussion on School Lighting (*Illuminating Engineering*, March and April, 1910), and the report on school books prepared by a special committee of the British Association which will be issued at the summer meeting of this year.

In conclusion. The work done by the eye, by its muscles, by its sense organs, and by the whole intricate ramifications of neurons which convert reception of images into perception and reaction, is so great that to strain the growing eye of a child is to do the child "grievous bodily harm"; whilst should that eye be already handicapped by a defect of shape, size, or muscle equipment that harm is certain to be intensified and the handicap increased. These conclusions point to the necessity for the strict limitation of the eyework of the young child, and the necessity for the detection and treatment of defective children by the provision of effective school inspection and treatment, and a suitable curriculum for those so defective as to be incapable of following the regular school routine.

THE INSTRUCTION OF THE YOUNG IN SEXUAL HYGIENE.

By ERIC PRITCHARD, M.A., M.D.

A Paper read at Conference of the Child-Study Society, held in the University of London, Saturday, May 11, 1912.

In the first place, some explanation is due from me in justification of the title which I have adopted for this paper. It has been suggested that it would have been better to have employed the comprehensive term "Sexual Pedagogy," or that for "Sexual Hygiene" the term "Sexual Matters" or "Sexual Physiology" might have been profitably substituted. I thought, however, that the larger term, "Sexual Hygiene," might be understood to include those many aspects of the sex question which have for their common objective the scientific teaching of morality. The truth of the matter is that in this comparatively new science we are faced, as Dr. Saleeby has expressed it, with terminological difficulties. We have no suitable vocabulary, and such words as "Sexual Hygiene," "Sexual Instinct," "Reproduction," "Pregnancy," are not only distasteful to those who are entrusted with the difficult task of explaining the origin of life to young persons, but it is also very doubtful whether they are capable of conveying the desired shades of meaning to the undeveloped understanding. With the growing importance of this subject it is to be hoped that our language may be enriched with a more dignified and picturesque nomenclature. In examining the reports of the Successive International Congresses on School Hygiene it will be noticed that both the French and German languages are equally sterile in this respect.

But these successive reports, published respectively in the years 1904, 1907, and 1910, prove that if its vocabulary has not been materially enriched, at least public interest in the subject itself, as measured by the length and number of the papers recorded, has increased by leaps and bounds. It is now no longer a matter of debate amongst international experts whether children are to receive instruction on matters which relate to sex hygiene. No! The question that now demands attention is who is to teach them, how, when, and where! But so far only some slight echo of this agitation which has aroused educationists on the Continent and in America has reached our shores.

Although we have not yet accurately determined the position of sexual hygiene in our system of education, none the less there are certain points with respect to which there does appear to be universal

agreement, and on which our ideas have attained to a condition of crystallization. First and foremost among these accepted postulates is the demand that children should be told the truth, not necessarily the whole truth, but truth sufficient for their present needs, and co-ordinated to their powers of understanding. "Better," said Ruskin thirty years ago, "a child should be ignorant of a thousand truths than have consecrated in its heart a single lie." And to-day we cannot improve on this apothegm. It is quite impossible for normal children to remain in entire ignorance of the phenomena of sex, such a belief assumes that they have neither eyes nor ears, that they are void of curiosity, and barren of the great primary instinct of sex. No normally constituted child can avoid drawing inferences from what he sees and what he hears, from the conversation of others, from the biological experiences of everyday life, and this under the most favourable circumstances of the sheltered life in a well-conducted home. But even in these sheltered homes there is always a very real danger of wilful contamination by impure minded servants or older children. Enlightenment of this kind is the very worst sort of enlightenment that can illumine the innocence of the still unformed mind. But it is nearly always from pernicious sources of this kind that the child acquires his pseudo-knowledge on matters sexual, unless his enlightenment has been deliberately designed by his parents or teachers. To allow a child to run the risk of acquiring undesirable knowledge of this kind in an undesirable way from undesirable sources is, as Havelock Ellis puts it, like admitting "that there is no need to supply sources of pure water when there are puddles in the street that any one can drink of." Thanks to the findings and operations of psycho-analysis we now know that the sexual life of children is much wider and richer than it was formerly supposed to be. And that their relationships with others, their affections, their aversions, their hatreds, their joys and fears are often swayed and determined by that prime mover of our psychological activities, the sexual instinct. Although, perhaps, we should receive with caution some of the assertions made by the more zealous exponents of the psycho-analytical methods, there can be no doubt whatsoever, that a vast number of hysterical manifestations, obsessions, psychoses, and other abnormal, mental, and physical states of children owe their origin to the operations of the sexual instinct, perhaps unduly provoked, almost certainly unnaturally repressed. It is indeed difficult for the uninitiated to understand that such apparently innocent habits as the making of grimaces and the biting of nails can have for their basis a simple repression of this natural and overwhelming instinct. To Professor Sigismund Freud, of Vienna, and his followers, we owe this

unexpected exterpretation of many otherwise inexplicable psychological phenomena.

We know, then, that the sexual instinct is far more precocious in its development than we formerly suspected. And we know, thanks to the work of Freud, that when this instinct is suppressed or repressed it may give rise to strange vagaries of conduct, not only in children but in individuals of all ages and both sexes. It becomes, then, a matter of the highest importance that this dominating instinct—an instinct which indeed does not arise quite spontaneously but at the dictate of some liberating stimulus—should be safeguarded and protected from every conceivable circumstance in the environment which is calculated to exercise upon it a detrimental influence. What are these influences, and how can they be controlled? How can you protect a child of five or six years from circumstances in the environment which can arouse from its dormant state this master instinct? How can we prevent its repression giving place to some equally disastrous neurosis? These ends cannot be attained on the customary nursery principles of instruction. How with our present conception of the propriety of social behaviour can we prevent the repression of those lines of conduct to which the awakening of the sexual instinct inevitably leads the child? Let me give you an instance which actually came under my notice. A small child, four years of age, with the awakening of the sexual instinct, was observed with an imperative desire to expose itself. The child was promptly punished by the nurse, and the incident was not allowed to be forgotten, but the child was frequently warned against a repetition of the misconduct. The child evidently brooded over the trouble, and subsequently developed a serious neurosis. Under these circumstances how should the nurse or the mother have acted? I do not adduce this incident because I have an answer ready, but because I wish to impress upon all concerned the extreme difficulty of dealing with cases of this kind in accordance with rational methods.

I submit that these questions are of enormous importance and most difficult to answer, and I cannot think that we shall find a satisfactory solution to the problem by burying our heads, ostrich-wise, in the sand and saying that they do not exist. I am not one of those who believe that every child should receive its first lesson in sexual knowledge from its mother, and I am of this opinion because I have seen enough of mothers to know that, for the most part, they are absolutely incompetent of conveying this knowledge in a way that would be calculated to be of benefit to the child. Further, I would remind you that most of those who, with the utmost assurance, give the advice that the mother, and

the mother alone, should supply this early instruction to the child, are clearly thinking only about classes, who at least have an education, if they have not an understanding.

But how about the great masses of the people who have neither understanding nor education, how are these mothers to give their children the requisite foundation of sexual knowledge? Among these classes, and I say it with the greatest deliberation, the majority of children have learned more by ocular demonstration before they are three years of age than the children of the upper classes leading sheltered lives learn by the time they are fifteen years of age.

How young children are to be taught the elements of sexual hygiene, how they are to be protected from the stimuli which awaken precocious instincts, how they are to be saved from developing serious neurosis as the result of the repression of these insistent reflexes. Surely this is a matter which calls for the exercise of the best brain power in the country—surely it is not one to be dismissed as offensive to our over-refined sense of decorum and modesty. Personally I have no great opinion of amateur work when there are experts or professionals to be procured. I believe that parents make very bad instructors for their children, and I believe that the two great classes of individuals who are best qualified to formulate an opinion on this question, namely school teachers and doctors, share this opinion with me. I do not know how young children, say of three to six years of age, should be instructed in matters relating to reproduction and the origin of life, but I think that even children of tender age, if they are to be instructed at all, should be taught in the most skilful way and by the most competent teachers. I believe it to be work for experts, and I contend that we must make and create these experts, for we have not got them now. After a time a certain proportion of mothers may perhaps be taught how to perform these difficult duties for themselves.

The psychological moment, or moments, at which children should be instructed in these important matters cannot, in my opinion, be fixed by the criterion of age or the degree of mental development. Each case must be judged on its own merits and by those *imponderabilia* of character which are sometimes known in the aggregate as temperament. Dr. Blom says "better a year too early than an hour too late," but here again I maintain the success or failure of any particular system of teaching depends not so much on the time or the system as on the individual capacity of the teacher. Writing on this subject* Dr. Ira S. Wile suggests that the education of children in sexual hygiene naturally divides into three age periods, (1) the age of mythology,

* *Archives of Pediatrics*, vol. xxix. p. 131.

(2) the age of chivalry, (3) the age of civic awakening, for each of which special rules of instruction are indicated. On the other hand, Dr. Ernest Jones * claims that the aims of enlightenment should be based on the following considerations. (1) In the first place, to inculcate an attitude of purity and naturalness towards matters of sex, so that the child will be steeled against impure suggestions and thereby enabled to maintain high ideals in this respect. (2) To prepare children for the physiological occurrences inseparable from their sexual development, and above all for the function of parenthood. (3) To provide them with such knowledge of sexual hygiene as to enable them to guide their sexual lives amidst the numerous dangers and difficulties that are likely to beset them. According to this régime enlightenment should be brought about by a series of graduated steps, and should be adjusted to the varying needs of the individual child. Dr. Martin Chotzen, of Breslau, one of the greatest authorities on the sexual education of children, lays down somewhat arbitrary rules † for a progressive course of sexual instruction which is designed to extend from infancy until the time of marriage. He insists that for the present lectures in sexual hygiene must be given by medical men for the reason that doctors alone possess the necessary knowledge for this kind of teaching. Further he insists that if sexual education is to be crowned with success it is desirable that the parents and school teachers should be instructed in the necessary details and principles of physiology, psychology, and hygiene. Dr. Chotzen seems to me to fall into the same kind of error that is noticeable in the writing of nearly all authorities who write on this subject—he legislates for the children of the privileged classes. This narrow conception of the sphere of usefulness of sexual pedagogy must be banished from our minds if we are to do justice to the immensity of the subject and the vast numbers of children who have claim to its benefits. We have not to consider the half million children of the upper classes, but the six million children of the proletariat.

I do not pretend to any special knowledge of the practical details of the teaching of sexual hygiene to young children, but of this I feel convinced; the real obstacle in teaching children the elements of sexual hygiene is the difficulty most of us experience in effacing from our minds our own shamefaced conceptions of these fundamental and physiological truths. We find it difficult to forget the impure sources of our own information on these subjects, and impose unnatural barriers to the satisfaction of the child's legitimate curiosity on these points.

* *School Hygiene*, vol. iii. p. 135.

† "Reports Third International Congress of School Hygiene," vol. ii. p. 17.

The object of this paper is not so much to offer suggestion as to invite discussion and stimulate thought. For the present those who are interested in these matters can best expend their energies in preparing public opinion for the changes which are inevitable, in dispelling from the average mind the belief that ignorance is synonymous with innocence, and that purity cannot only be maintained by hiding from the child those fundamental truths which sooner or later it must discover for itself. For my part I believe we are wrong to suggest that parents should themselves attempt to undertake so difficult and delicate a matter as the instruction of their children in the matters of sexual hygiene. I do not think that uninformed individuals should presume to step in where the best instructed and most competent experts only tread with the greatest diffidence and fear. As I have already indicated, children are extremely apt to develop strange and unexpected neuroses as the consequence of the repression of natural sexual instincts. I think it extremely likely that we shall meet with a very luxuriant crop of such neurosis if without wider knowledge of the subject parents attempt to repress these natural instincts by artificial means. I think that the conception that parents can perform this difficult task is a wrong one. I think we are commencing at the wrong end. I would rather suggest that for the present we direct our energies to the formation of societies (Volksbildungsveneine and Elternabende) for the debate and discussion of these questions among parents and teachers; and that lectures on sexual hygiene be included in the syllabus of instruction for intending teachers, and that others be arranged in post-graduate courses for masters already in the profession. And that with respect to the actual teaching of children and young persons we should for the present confine ourselves to the instruction of adolescents and those who have already passed through the critical period of puberty. There does not seem to me to be any pressing hurry to reach the lower levels of childhood; the younger the child the more difficult is it to instruct without incurring the very real danger of repressing natural instincts in a manner that will react most injuriously on its entire organization. I do not for one moment believe that the child by its unaided judgment will arrive at the best solution of this most difficult problem. I believe that in ninety-nine cases out of a hundred the solution arrived at by this means is bad, thoroughly bad; but all the same I do not consider that we are likely to discover any much more satisfactory solution until we know a great deal more about the subject than we do at present. My view, therefore, is that we should essay the easy task first and attempt to instruct young adolescents, and then as we gradually acquire more knowledge of the technical difficulties, and

become more skilled in the practical details of teaching, we should take up the instruction of younger and younger classes of children, leave as little as possible to the parents who have already given abundant proofs of their willingness to shirk this responsibility, and rely to a very large extent on expert knowledge and expert teaching.

HOW A TEACHER CAN TEST THE VALUE OF HIS OWN METHODS: A RESEARCH IN EXPERIMENTAL PEDAGOGY.

By W. H. WINCH, M.A.

I. Why Experiment is Necessary.—All who belong to child-study societies are pledged, more or less, to the following principle: Educational methods must be based on the genetic psychology of the child.

All educational psychologists, by the very nature of their work, hold doctrines which involve the same principle. But it must not be supposed that all questions of method, when the genetic psychology of the child is duly known, become thereby fixed and definite. To some of us, at least, there is considerable satisfaction in the thought that the pedagogical conclusions which can be drawn, even from the most accurate psychological foundation, will leave us with considerable elasticity in our methods. It will still be necessary to try, by actual experience, how much, if at all, one method is better than another. It may even be necessary to show that any method in teaching is better than no method at all. For, nowadays, as in medicine, so in education, there is an increasing confidence in Nature's way. As a practical illustration, most of us are well aware how the "no method" method of teaching drawing has, just at present, gained a victory over the highly elaborated methods of procedure which were formerly in vogue, and the same tendency is being shown in the newer views as to the teaching of reading. For, without doubt, children will learn much for themselves, especially if suitable material be presented. Some educationists have, indeed, asserted that we ought never to do more than merely present material, taking care, of course, that it is appropriate to the different stages of the child's mental evolution.

Well, those who accept the principles of the new science of experimental pedagogy do neither assert nor deny that practice is better than teaching. They are disposed to be dogmatic only in one respect: they are inclined to assert that the only way to be at all sure about these things is to subject them to the test of actual experience. Does practice

produce better results than teaching? Does one method produce better results than another?

"Is that all?" I can hear a number of disappointed teachers saying. "We all knew that long ago. Every good teacher judges his methods 'good' or 'bad' in so far as they produce the results he wants in the best and quickest way." And there are hundreds of inspectors, organizers, and instructors who visit schools and tell the teachers which methods produce the best results. It is true they often contradict one another, but the teacher certainly gets advice.

The whole of our educational system, just now, is permeated with the notion that methods are everything, and, on every side, excellent methods are being recommended to teachers on the strength of the excellent results which they are stated to produce.

What more can we want? Surely, by this time, all the more important questions of school methods have been settled. In suchwise might teachers conceive that an answer could be given to the questions I have raised.

In the minds of organizers and instructors I fear that the *methods* they favour, and the *results* of the methods they favour, are too often undistinguished. They are prone to report the work of schools as improved merely because their own particular methods have been followed. And inspectors and teachers are apt to judge of results, indeed for many years *have* judged of results, and consequently of methods, on a much too cursory analysis of the conditions. Confident assertion on the one side is met with equally confident assertion on the other. Who is your inspector? is held to be quite a relevant question when one teacher is discussing questions of method with another.

All this is very unsatisfactory, and the growth of the sciences of educational psychology and experimental pedagogy is the only pleasing feature in the present situation. But in what way are these sciences to help us? What can they do to establish our educational doctrines upon a more secure basis? The ideal is, that (under guidance, if necessary) the disputed points of educational theory and practice (and which of them are not disputed?) shall be settled by actual experiment in the schools themselves.

I purpose to show what is meant by this statement, not by general dissertation, but by giving an actual research, undertaken to answer a question which was raised by several teachers themselves. It arose in this way. In the course of some lectures dealing with experiments on fatigue and adaptation in school work, the teachers had noticed how general and continuous the improvement of the work of the children seemed to be, even when they had not been taught, but

had merely been practised in successive exercises dealing with the same thing. This had been noticed even in problematic arithmetic, which is currently supposed to demand much teaching before success can be assured. Of course, we cannot *entirely* eliminate the effect of previous teaching, as we can in certain psychological experiments. But noticing the improvement under practice, *without direct teaching*, several teachers said, "Why teach problems at all? The children *appear* to improve just as much without teaching." "Oh no," said others, "the improvement by practice will soon stop, and the children will improve much more *with* than *without* teaching."

The only way to settle the dispute is to try both ways and see "That's easy enough," one is tempted to say, "*until one tries*." And may I say that the people who try, and who eliminate the causes of failure (for failure is almost certain at first) one by one, are well on the way to become expert experimentalists? And may I say also that they will thereby obtain just that kind of knowledge of children which enables teachers, already good, to achieve excellence? Let us go through the experimental procedure, step by step; let us see what the difficulties of the experiment are, and how they may be overcome.

II. The Precautions needed before the Experiment can be Started.—The first element of importance is the active sympathy and help of the teacher of the class.

I do not by any means overlook the importance of the sympathy of the principal, but I want to insist on the fact that, unless the teacher of the class is also anxious to secure a strictly scientific result, there is a strong probability that the experiment will not succeed. For if the class teacher suspects in any way that the work is inspectorial, that is, conducted with a view to discover whether his work has been properly done, there is very little likelihood that the experiment will succeed; for the temptation will be extremely strong for the teacher to try to influence the results unduly, and to produce some of those marvellous results which are very gratifying to the public at educational exhibitions, but which at once inspire the experienced teacher with feelings of disgust, not unmixed with resentment.

The second element of importance relates to the question of "equal groups." If we try one method with clever children, and another method with inferior children, the clever children will do the better; not because the method by which they are taught is the better one, but because they are the cleverer children. Comparisons instituted between the subsequent work of groups of children which are unequal at the outset are worse than worthless; they are positively misleading. And we must go further; we cannot suppose, because the *general* ability

of two groups of children is about the same, that therefore their ability is the same in the function with which we are specially concerned. We must measure that function first, and it is best to measure it several times, for children vary somewhat from day to day, and, until their work is "steady," it is very difficult, if not impossible, to divide them into equal groups.

A third point of importance is concerned with the nature of the questions set, on the results of which the class is to be divided. They must be hard enough to give even the best children sufficient to do; they must be easy enough to enable the weakest children to do something.

Perhaps, with these preliminary explanations, the details of the experiment, which I now propose to give, will be more readily understood.

III. The Details of the Experiment.—1. *The Class which did the Work.*—This experiment was carried out with the whole of a Standard IV. class of an average age of ten years nine months, half-way through its educational year. The work was done in a girls' school situated in a fairly good neighbourhood in the south-west of London.

2. *The Tests and the Method of Marking.*—The following was the first set of problems :—

(1) A man paid 10*s.* a week for rent, 13*s.* 6*d.* for food, 4*s.* for clothes, and 1*s.* 6*d.* for lights and fires; how much would he save out of 35*s.*? (*Two rational steps.*)

(2) A wheel of a bicycle is 5 feet round the rim. How many times would it turn round in travelling 1560 yards? (*Two rational steps.*)

(3) On Monday a woman paid 3*s.* 10*d.* for meat, on Wednesday she paid twice as much as on Monday, and on Friday three times as much as on Monday; what did her meat bill amount to for the three days? (*Three rational steps.*)

(4) A woman had 300 yards of linen from which she could cut 200 tea-cloths; how many could she cut if each cloth was half a yard longer? (*Three rational steps.*)

(5) A man went out with a sovereign, a half-crown, and three pennies in his pocket. He bought a hat for 5*s.* 9*d.*, gloves for 2*s.* 10*d.*, shoes for 12*s.* 6*d.*, and tobacco for 1*s.* 7*d.* He gave all that he had left to a beggar; how much did the beggar get? (*Three rational steps.*)

The children were required to work the problems in the usual way. But in marking their work, no notice whatever was taken of the numerical accuracy or inaccuracy; *the sole consideration was the accuracy of the rational steps by which they endeavoured to solve the problems.* Any step which was on the way to a correct solution by any method

received one mark. The maximum mark for each problem is given in brackets after each question, *i.e.* one for each rational step. Experienced teachers will need no further indications of how the papers were marked.

The second, and every succeeding set of problems was exactly like the first set in principle, but the wording and the numbers given in the questions were changed.

Thus, to take one illustration, problem 4 in the second set became : A man had 144 pounds of tea, from which he made up 288 packets. How many packets could he have made if he had put a quarter of a pound more tea in each packet ?

In all cases the numerical work was very easy, so that the whole difficulty rested with the methods of rational solution.

3. *Chronology of the Experiment.*—The first set of problems was given on Friday, October 6, 1911, from 9.45 to 10.30 a.m., immediately after Scripture lesson. The second set was given at the same time of day on Wednesday, October 11, and the third set at the same time on Friday, October 13.

On the results of these three exercises the girls were divided into two equal groups. It is by no means easy to divide the children into two groups which are really equal ; but, with care and patience, it can be done.

When the two groups had been made out, we were ready to begin the next stage of the experiment. One of the two groups—henceforward called Group A—now received three lessons, in which they were taught how to work problems involving the same reasoning as those which had already been set. They were taught in the following way : Each problem was worked out concretely with small numbers. Then it was worked with small numbers mentally, and finally it was worked by the teacher on the blackboard with large numbers. Meanwhile the other group—henceforward called Group B—had three more practice lessons with three more sets of problems. The teaching lessons and the practice lessons were given from 9.45 to 10.30 a.m., on Wednesday, October 18, on Friday, October 20, and on Wednesday, October 25.

Finally the two groups, A and B, on Friday, October 27, on Wednesday, November 1, and on Friday, November 3, at the same time in the morning as before, worked three further sets of problems, drawn up as on previous occasions. These exercises will be referred to subsequently as the Final Tests, in contradistinction to those which were set at first in order to divide the class into equal groups. The former will be called the Preliminary Tests.

We have now the material to enable us to determine how far, if at all, the group which was taught have made more progress than the group which continued to practise whilst the other group was being taught.

4. *Results.*—The first step was, of course, the correct division into two equal groups. The following table will show how the children were arranged.

TABLE I., SHOWING THE DIVISION INTO TWO EQUAL GROUPS.

Group A.				*Group B.*			
Name (initials only).	Preliminary Tests. 1st.	2nd.	3rd.	Name (initials only).	Preliminary Tests. 1st.	2nd.	3rd.
P. A.	10	10	10	B. D.	10	10	10
N. E.	10	9	11	F. D.	10	10	10
K. M.	8	9	10	I. A.	9	8	9
C. E.	8	5	7	M. S.	8	6	7
20 girls, av. mark	8·3	8·0	8·7	20 girls, av. mark	8·3	8·1	8·6

The maximum mark for each exercise was 13; no child obtained the maximum either in this or in any other of these tests, and every child was able to accomplish something in all of them. Adding together the total marks obtained by Group A in the Preliminary Tests we find that an average mark of 8·3 is obtained per child per exercise, and similarly, for Group B also there is an average mark per child per exercise of 8·3.

Then, it will be remembered, there were three teaching lessons for Group A, and three more practice lessons for Group B. There were, of course, no marks given for these lessons to Group A. The average marks per child per exercise in Group B were, for the first practice exercise 8·2, for the second practice exercise 8·3, and for the third 8·6. It is usual, as teachers well know, for the improvement effected by mere practice to diminish after a time, but in this case it seems rather quickly to have ceased altogether, for the average mark of Group B for the practice exercises is 8·3, which is just the same as the mark obtained in the Preliminary Tests. That improvement has not really ceased is shown by a further improvement by practice later on.

Now come the Final Tests. Group A scored an average mark per child per exercise of 11·0 for the first test, 11·1 for the second test, and 11·3 for the third test; whilst the corresponding marks for Group B were 9·1, 8·9, and 9·6. The mark of 8·9 was obtained after the mid-term holiday, which did not appear to cause a reduction of the mark for the group which had been taught.

Totalling the marks for the Final Tests we find Group A with an average of 11·1, whilst Group B scores 9·2 only. Group A—the group

which was taught—improved on its preliminary record to the extent of 34 per cent., whilst Group B showed an improvement by practice alone of 11 per cent.*

But it remains to be seen how far the difference shown is shared by the more proficient as well as by the less proficient members of the two groups. The following table will indicate this.

TABLE II., SHOWING THE TAUGHT AND UNTAUGHT GROUPS COMPARED, SECTION BY SECTION, IN THE PRELIMINARY AND FINAL TESTS.

	Group A (Practised and Taught).			*Group B* (Practised only).		
Marks in 3 Preliminary Tests.	No. of Girls.	Av. mark per child per test in 3 Prely. Tests.	Av. mark per child per test in 3 Final Tests.	No. of Girls.	Av. mark per child per test in 3 Prely. Tests.	Av. mark per child per test in 3 Final Tests.
30 and over .	2	10·0	11·5	2	10·0	10·5
25 to 30 . .	9	9·2	11·1	9	9·2	9·6
20 to 25 . .	7	7·6	10·9	7	7·6	8·7
Below 20 . .	2	5·8	11·5	2	5·7	8·0

It will be noticed that the group which has been taught shows better results all along the line, the two children at the bottom of Group A show, indeed, quite extraordinary improvement.

IV. PEDAGOGICAL CONCLUSIONS.—Good teaching appears to do much. I say this, believing as I do, that there is too much teaching and too little practice in most, if not in all, of our London schools. But we must not, in putting forward the claims of practice, neglect the proper function of teaching. These girls tried hard, test after test, to obtain higher marks, for they had been told, test by test, how many marks they received. They were, therefore, in a mental condition which was responsive to teaching; it came as a solution of difficulties which they had themselves felt.

This method of dividing a class into equal groups, with the training of one group in one way and of the other group in another way, will enable us to come to conclusions about school methods and practices which are really scientific. By such procedure, gradually, we shall build up a real science of education to which all can appeal, Professors, Inspectors, and Teachers, unified in the common bonds of research and knowledge.

* The variabilities of these averages have been calculated, and the correlation coefficients between the successive tests of the series, in order that what is known as the "probable errors" of the averages may be estimated. Mere averages are not reliable.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Stages of Development.—"The sciences of biology, physiology, and psychology all support the view that each stage of development is preparatory to those that are to follow, and that any disturbance of development at any period is likely to affect the final result. This is most strikingly shown in biology, as, for example, in the case of insects where injury or unfavourable conditions during the larval stage result in an imperfect form of insect. To be a perfect butterfly it is necessary to first be a perfect caterpillar, and to be an ideal man the child characteristics must first be well developed."—*Professor E. A. Kirkpatrick*, in "The Individual in the Making."

The Constructive Instinct.—"From the time the child begins to pile up sand or blocks, through the ages when boys construct tools and dig caves, and men design temples, bridges, business blocks, and balloons, the constructive instinct is prominent. There is a peculiar pleasure accompanying these acts of construction, perhaps because one feels and perceives in concrete form the evidence of his power to do, to modify and change. The destructive tendency is probably only a modified form of the constructive, for it gives the same evidence of power to change. The destruction or displacement of something is often merely a preliminary to the construction of something else of the parts or fragments that are being made. Children frequently break or take apart complex toys and make some crude thing in which they take great pleasure. The constructive instinct naturally associates itself with the adaptive instincts of imitation, play, and curiosity, with the æsthetic and expressive instincts, and sometimes with various other instincts and motives."—*Professor E. A. Kirkpatrick*, in "Fundamentals of Child Study."

How to study Infants.—"Instead of trying to catalogue the child's movements, his various sense activities, his feelings, etc., as most observers of children do, we should more profitably note in the exact order what he does day by day, without any attempt to say what particular point these acts illustrate, watching simply their increasing complexity and the number of elements involved in them. The chief significance of a new movement, a better management of the eye, a sense of position, of creeping, grasping, etc., is not that it simply occurs, but in what sort of activity it occurs, what it helps to do, why it has arisen. To separate the sense-experience or the particular hand-movements, or talking, or the recognition of colour, from the setting to which it arose is to deprive it of its main significance . . . [We are not] as

much interested in *when* a child first says *man* as in knowing *what* he was doing at the time that made him say it, or what he did afterwards *because* he said it. *It is the entire act that is important.*"—*Dr. Irving King*, "The Psychology of Child Development."

The Essentials of a Good Experiment.—"Summarising the essentials of a good experiment, we should say, first of all, let the kind of activity to be studied be definitely marked out. It must then be noted to what extent, without creating any artificial conditions, it can be studied in comparative isolation. Next, the test itself must be arranged so as to give exactly the results aimed at with a minimum of extraneous elements. In the interpretation of the results it is of the utmost importance so to frame the rubrics [headings] under which the data are to be classified that the personal equation of the investigator shall be reduced to a minimum."—(*Ibid.*)

Experimental Work and Training Colleges.—"Research work can alone solve the problems in education. It is being done by the schools of education in the universities. These schools of education are grappling with the real problems in education and life that the normal schools have left wholly untouched. It is my contention that the normal schools are now prepared to enter, and should enter this field of work. . . . Everyone engaged directly or indirectly in the elementary or the secondary schools knows that much of the work is merely 'marking time.' . . . Educators know that there is great waste. . . . The results are deplored and criticised. The people do not know the remedy. Educators are expected to know it, but they do not. They are getting anxious to find out. The people are pushing them on to find out."—*President W. J. Hawkins*, quoted in "The Journal of Educational Psychology," U.S.A., May, 1912.

A Scientific Form of Questionnaire.—"The ideal questionnaire is one which asks for information which the questionee is sure to possess and willing to give, and which he can state briefly and unequivocally—which asks questions, for example, that can be answered by 'yes' or 'no,' or by definite statements of facts or figures. When it goes beyond questions of this sort and asks for matters of personal history or of opinion and belief, it soon reaches a point where a quantitative treatment of the data is impossible, or, if possible, is often misleading. The best that can then be done is to gather the material into characteristic groups or types and to attempt little beyond a liberally illustrated description of these. A second important point is to see that the questions are answered by all the group which you have under consideration, or, if it is too large for that, by a perfectly fair and adequate sample of the whole group. A set of questions with

reference to conversion answered by a class of clergymen would, of course, be hardly a fair basis for inference as to the religious experiences of the man in the street."—*Professor Edmund C. Sanford*, in "The Journal of Educational Psychology," U.S.A., June, 1912.

NOTES.

THE ANNUAL CONFERENCE.

Our annual conference was held, at the invitation of the London Society, in the Jehangier Hall of the University of London—by kind permission of the Senate—on Thursday, Friday, and Saturday, May 9, 10, and 11, 1912. The subject for consideration was, *The Health of the Child in relation to its Mental and Physical Development.*

Besides delegates from the following constituent societies: Birmingham, Cheltenham, Dundee, Edinburgh, Exeter, Halifax, London, Manchester, and Tunbridge Wells; there were present invited representatives for the University of London, The Royal College of Surgeons, The National Union of Teachers, The College of Preceptors, The Head Masters Association, The Head Mistresses Association, The National Education Association, The Sunday School Union, several Assistant Teachers Associations, and about thirty other Educational, Learned, and Scientific societies. Among those present was Miss Crees, one of the three original founders of the old British Child-Study Association. A special invitation was sent to the London training colleges for teachers, offering free admission for a certain number of their students. In response to this a good number of students attended. Miss Alice Woods, a longstanding friend of the Society, made special arrangements with the committee for the attendance of many of the students at the Maria Grey Training College.

The Meetings.—On Thursday evening, May 9, members and delegates of the constituent societies, and others, were received by Sir Richard Martin (President, London Society), Sir Edward Brabrook (Chairman of Council, London Society), and the Council of the London Society. Refreshments were provided in the fine marble entrance hall of the university, where the excellent singing of some boys and girls from the Addison Gardens L.C.C. School, under their headmaster, Mr. M. H. Atkin, was very greatly enjoyed, and a special vote of thanks to them was charmingly proposed by our President.

The President, Sir James Crichton-Browne, was accompanied by Lady Crichton-Browne, to whom a splendid bouquet of roses was presented by Miss Hilda Durrie Mulford. Many representatives from kindred societies were present at the reception, and we had the good fortune of welcoming Sir Charles Mackellar, President of the State Children Department, N.S.W., Australia, and Professor Kirkpatrick (U.S.A.), the author of "Fundamentals of Child-Study," as visitors.

After the reception those present went to the Jehangier Hall where the President delivered his presidential address, with that fine oratorical manner of which he is such a master. Though long it was listened to with close interest, and a very warm and appreciative vote of thanks was passed for it, on the proposal of Professor H. R. Kenwood, seconded by Surgeon-General Evatt.

The presidential address and the papers contributed to the conference will appear in *Child-Study* in due course, and, therefore, we need say nothing about them, as our

readers will be able to form their own opinions at leisure. But we very much wish that we could have given a full report of the speeches of the various chairmen, openers of discussion, and those who took part in the discussions. Much was said that was of great value, but our resources are at present unequal to the cost of reporting and printing such matter. We believe that none will grudge a special word of recognition to Professor Kirkpatrick for his valuable and graceful contributions to the discussions. To the readers of the papers ; to our chairmen : Hon. Sir John Cockburn, Sir Richard Martin, Sir Edward Brabrook, Sir James Yoxall, and Professor Adams; and to the openers of discussions : Miss M. A. Broadbent, Drs. Alice Corthorn, Macleod Yearsley, F. W. Edridge-Green, Percy Nunn, the Society's best thanks are due. Also to Dr. Saleeby for his admirable public lecture—see abstract below—and the unusually fine discussion for which he was responsible afterwards, thanks are due.

Many regrets were expressed that, owing to the inventor's sudden and very regrettable death, the demonstration of Mr. J. Gray's appliance for estimating mental aptitudes had to be abandoned. The demonstration with ex-scholars of what may be done for the hard of hearing by a teacher of the deaf, given by Mr. B. P. Jones, was an interesting item, which followed Dr. J. Kerr Love's paper.

The garden party at The Royal Normal College and Academy of Music for the Blind, Upper Norwood, to which those attending the conference were most kindly invited by Sir Francis and Lady Campbell, was very greatly enjoyed by all those who went, who were also much interested in seeing the varied and excellent work of the pupils in the institution.

The reception given by Sir Richard Martin (President, London Society) and Lady Martin at their house in Mayfair, on Saturday evening, was a splendid conclusion, in its generosity and charm, to the conference. It was largely attended, and very highly appreciated.

Some Special Features.—All the papers were printed before the conference, bound up in sets, and sold at threepence a set during the conference. This was arranged so that the papers should be taken as read and the time given to discussion. The result was that excellent discussions took place.

The following were the rules for the discussions : Authors of papers will be allowed twenty minutes to introduce their papers. Openers of discussions will be allowed fifteen minutes. Other speakers will be allowed five minutes. The chairman will ring a bell to warn speakers they are approaching their limit of time ; when the bell is rung a second time speakers are asked to sit down. As a rule no one may speak twice except with the permission of the chairman. Those desiring to take part in a discussion must send up their name, address, or card, to the chairman.

The Educational Supply Association provided a bookstall for the exhibition and sale of literature relating to child-study, and carried out the arrangement very satisfactorily.

The Workers.—Many meetings were held and much hard work done—especially by the chairman—by the conference committee consisting of: Miss Stevens, and Messrs. Tibbey (*Chairman*), Hayward, Holman, Jones, Kimmins, Pritchard, Shrubsall, Shuttleworth, and Durrie Mulford (*Hon. Sec.*). The duties of securing hospitality for provincial delegates were competently discharged by a ladies' committee including : Mrs. Richards and Mrs. Truelove, and Misses Stevens (*Convener*), Dixon, Hardy, Jobson, and Cash (*Hon. Sec.*).

The stewarding of the meetings was thoroughly well done by members of these committees, assisted by Messrs. Crisp, Frost, Hayes, Sharman, Sweeney, and Webster.

A very special word of thanks is due to Mr. Durrie Mulford, who, as always, gave

unsparing and ungrudging service to the work of organizing the conference, and did an immense amount of work with his usual thoroughness and competence. He was most ably seconded by Mrs. Mulford, who is a constant benefactor to the Society in practical helpfulness. Nor must the many services of Miss Louch and Miss Cash be forgotten.

The Council Meeting.—This was held in the library of the Royal Sanitary Institute on Saturday afternoon. It was a well-attended meeting, and there was keen discussion on some points. An invitation from the Liverpool Society, to hold the conference there next year, was unanimously and cordially accepted.

Those attending the council meeting were entertained to tea by the Council of the London Society, and a few visitors—including Professor Kirkpatrick—were invited to meet the delegates.

Dr. Saleeby's Lecture.—The following abstract of the lecture was prepared by Dr. Saleeby, and circulated at the meeting :—

Eugenics and Child-Study.—The possibility of any practical eugenics primarily depends upon just discrimination of the individual before adolescence—*i.e.* upon child study. As the lecturer argued in his paper on "Eugenics and Education" before the British Association last year, the eugenist requires the educator to observe, study, and define the children before him, so that, at adolescence, our eugenic duty may be apparent in each case. Only child study will distinguish between the characters that are natural and therefore transmissible and of eugenic importance, and those which are natural, non-transmissible, and irrelevant for eugenics. Most serious objection must be taken to the work of Professor Karl Pearson and his school on this point alone ; the distinction between the feeble-minded and the merely backward child is a case in point, and the American school of eugenists have lately pointed the moral. Only child study, also, can make those discriminations which are necessary in order to refute the party of eugenists, sprung up since the death of Sir Francis Galton, whose verdict on our present infant and child mortality is "better dead," and who may, with convenient ambiguity, be styled the "better dead" school of eugenists.

Delegates at the Conference.—*Birmingham*, Miss A. J. Dawes, L.L.A. ; *Cheltenham*, Miss McCutchan, M.A., Miss Mary Louch, Dr. R. Cunningham Affleck ; *Dundee*, Miss Kate Stevens ; *Edinburgh*, Miss J. K. Borland, M.A. ; *Exeter*, Miss A. J. Walker, Miss Cash, B.A. ; *Halifax*, Dr. D. Taylor ; *London*, Miss Ethel Dixon, Dr. Fletcher Beach, Dr. R. Langdon Down, Dr. A. Beresford Kingsford, Mr. T. G. Tibbey, B.A. ; *Manchester*, Dr. A. A. Mumford, Mr. H. Holman ; *Tunbridge Wells*, Miss Barker, Mr. and Mrs. Pontifex.

In conclusion we may safely say that the conference was in every way a great success, and the London Society is to be congratulated and thanked for the admirable way in which it was organized and conducted. The attendances—ranging from over 300 to over 400—papers, and discussions, were all good, and every one seemed to enjoy and approve the proceedings.

Next Year's Conference.—As mentioned above the annual conference is to be held at Liverpool next year, and the subject to be dealt with is, *Child-Study as a Link between the Home and the School.* The date fixed is May 22, 23, 24.

The Child-Study Library.—The Hon. Librarian reports that there has been a much freer use of the Child-Study Library since the issue of the new catalogue and library tickets. It is hoped that such free use will continue and increase, for there are many periodicals in this library which cannot be obtained elsewhere.

Corrections.—We regret that three misprints appeared in our last issue, and hereby correct them :—in Dr. Beresford Kingsford's letter, seven lines from the end, for *Thane* read *I have ;* and in Mr. Tibbey's review of *L'Educateur Moderne*, second

line (p. 31), for *Comfayré* read *Compayré;* in his review of *Bulletin de l'Education Morale de la Jeunesse* (p. 32), four lines from the end, for Mme. *Prigol* read *Pujol.*

Mr. Winch's Article.—Mr. Winch has been good enough specially to write his article for Child Study in the hope of helping teachers in their practical work. If any teacher who follows out Mr. Winch's suggestions will send an account of the results to the Editor, he will be very glad to consider it with a view to publication.

Reviews of Books.—Owing to the pressure on our space, because of conference matters, reviews of some books, etc., are held over for our next number.

REVIEWS.

Toys and Toymaking. By GEORGE F. JOHNSON, Inspector of Handwork, Liverpool. Longmans, Green & Co. Pp. 160.

Another of Mr. Johnson's excellent manuals, which very fittingly follows his *Rural Handicrafts.* It is designed to provide educative occupation for boys and girls both at home and school. As Mr. Johnson so well says in his preface: "Not the least important of the characteristics common to all children are the impulses which they possess to *play*, and to *construct*. . . . As a means of education in school or home, it is difficult to find a more satisfactory combination of impulses than that of playing and constructing."

Hints are given on how to use the book in the home or school; and these are followed by 104 models, with instructions for making them. The models form an unusually interesting set, and range from a wooden sword to a taxi-cab. At the end of the book there are good suggestions for group work. Every teacher and parent, who wishes to rejoice the hearts of little children, and develop their minds and bodies, should get this book. But one point we would very strongly urge upon them: in every possible case let the size of the object made be such that the child can use it in its ordinary play and playful work. To make miniature models of real things is too near a task for a child, but to make real things for its own use is the joy of joys.

The Gateways of Knowledge. By J. A. DELL, M.Sc. Cambridge University Press. Pp. vii, 171. 2*s.* 6*d.*

This is a very helpful book on the five senses, and should prove of very great service to teachers who are are taking their work seriously and scientifically. It is written on child-study lines, and some first-rate suggestions and directions for practical experiments are given. Our strong advice is: get it and work at it.

Publications Received.—*Journal of Education; Educational Times; Parents' Review; Educational Review* (U.S.A.); *The Pedagogical Seminary* (U.S.A.); *L'Education Familiale; The Training School* (U.S.A.); *La Escuela Cubana; The Shield; Journal of Experimental Pedagogy; Child Life; School Hygiene.*

Vol. 5.—No. 3. OCTOBER, 1912.

73

Child-Study.

The Journal of the Child-Study Society.

MEASUREMENT IN CHILD STUDY.

By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

(*Continued from page* 42.)

It is, I believe, to neglected anæmia and consequent malnutrition during the rapid growth period in girls that we must attribute much of the invalidism and debility from which grown women suffer. That state of things opens the door to tuberculosis and prepares the soil for many other maladies. But where there is no anæmia the state of the blood in the growth period in girls is a danger signal that deserves close attention. As I have shown, it is at that time in healthy normal girls enriched, so that there is circulating in their slight frames blood of adult male strength. The condition of the girl is then katabolic prior to her settling down into the anabolism proper to her sex. Her nervous system is in a state of erethism, and undue stimulation of it, and abridgment of the quietude and rest it requires, while passing through this phase is not unlikely to sow the seeds of morbid nervous manifestations later on. The roots of neurasthenia in women may often be traced to the time when the red blood corpuscles were in the ascendant.

I have been speaking of the significance of differences in the composition of the blood in relation to brain function, but there is another question bearing on blood supply, that is well deserving of consideration in connection with child study and the evolution of sex, and that is its distribution in the brain. Are all parts of the brain equally well supplied with blood, or are certain parts of it better irrigated than others, and is the system of irrigation the same throughout life? Are male and female brains equally well flushed with blood? In order to obtain an answer to the latter questions, Dr. Sydney Martin, F.R.S., some years ago, at my request, made a number of measurements by a

new method of the great arteries that carry blood to the brain. These arteries are, as I dare say you know, four in number, two internal carotids in front and two vertebrals behind, and these were measured at the point where they enter the cranial cavity immediately after passing through the skull and its outer membrane the dura mater. Dr. Martin found that the diameters of these four vessels taken together are slightly greater in the male than in the female. Their combined diameter was 8·2 mm. in the male, and 8·0 mm. in the female, but when the difference in size of the male and female brain is taken into account it was found that in proportion to brain weight their conjoint diameter is greater in the female than in the male, and so it appears that upon the whole the female brain receives as large, perhaps a slightly larger, supply of blood in proportion to its mass than does the male brain. But further it was found that the internal carotid and vertebral arteries, when their measurements were taken separately, displayed a marked difference in calibre in male and female brains respectively. In ten brains of male adults, free from brain disease, and from twenty-five to thirty-six years of age, the internal carotid arteries had an average diameter of 2·8 mm. on the right side, and 2·75 mm. on the left, while the vertebral arteries had an average diameter of 2·2 mm. on the right side, and 1·875 on the left; whereas in ten brains of adult females free from brain disease, and from twenty-five to forty-three years of age, the internal carotids had an average diameter of 2·6 on both sides, while the vertebrals had an average diameter of 2·3 mm. on the right side, and 2·075 on the left. It would thus appear that the distribution of arterial blood in the male and female brain differs to some slight extent. The internal carotids with their branches, the anterior and middle cerebral arteries, the great conduits to the fore and middle brain, are larger both absolutely and relatively in the male than in the female brain, but the vertebral arteries which minister to the occipital region are larger in the female than in the male brain, while again the basilar artery, which is practically a continuation of the vertebrals, is also larger in the female brain, where its average diameter is 2·8, than in the male brain, where it is 2·6.

There is no doubt a wonderful system of anastomosis, known as the circle of Willis, at the base of the brain, by which its circulation is protected from the possibility of interruption by the accidental closure of one or more of its arteries, and it might be thought that this rendered comparatively unimportant differences of calibre in the carotid and vertebral arteries, and must equalize the blood current in the different regions of the brain. But the fact is that the posterior communicating arteries which, when dilated after any pathological obstruction on the

cardiac side of the circle of Willis, maintain the circulation in the brain in tolerable integrity, are incapable while normal of adjusting the balance between the direct currents of the carotid and vertebral arteries, and so it appears that the arterial blood supply is somewhat larger in the anterior region of the brain in men, and in the posterior region in women. But these two regions of the brain are differentiated in function. The anterior region, comprising the frontal and parietal lobes and island of Reit, which in man receives the larger arterial supply, includes, speaking generally, the motor area, the speech centre, the higher inhibitory centres, and the association centres concerned in appetites and desires based upon internal sensations, while the posterior region, made up of the occipital and temporo-sphenoidal lobes, which in woman receives the larger arterial supply, is mainly sensory, and concerned with visual and auditory sensations. Vascular supply is invariably, in some degree, a measure of functional activity, the flow of blood having always some proportion with working power, and it is easy to see some correspondence between the richer vascular supply of the posterior region of the brain in women, and their delicate powers of sensuous perception, rapidity of thought, and emotional sensibility, and between the richer vascular supply of the anterior region of the brain in men and their greater originality on the higher levels of intellectual work, their calmer judgment, and more powerful volition. Romanes showed by his experiments that women can read much faster than men—the general belief is that they can talk faster—and that man has more decision of character.

It would be interesting to determine whether the vascular supply of the different regions of the brain is always the same, or varies at different periods of life; and a series of observations on the cross sectional areas of the cerebral arteries at different ages would be instructive. According to Landois, the child begins life with blood-vessels which are larger relatively to the heart than at adolescence. At birth the numerical ratio is given as 25 : 20, but at fifteen years of age it is 50 : 140, and in adults 290 : 61. This striking increase indicates that the work of the heart is relatively less in early life, and it implies that the blood-pressure also is lower at that age.

I have been dealing with certain physical measurements in connection with child study and youth study and brain-function, and I would turn for a little, if you will allow me, to certain psychical measurements, which are, I think, of much promise in child study, and which must prove useful in the recognition and classification of the feeble-minded.

The Report on the Royal Commission on the Care and Control of

the Feeble-minded, although it has not yet led to legislation, and although its ambitious projects are never likely to be fully realized, has yet already had a very salutary effect by directing public attention to the question, and by setting in motion a number of subsidiary inquiries, which have cleared up difficulties and prepared the way for remedial measures, and indeed in some instances secured them. Following upon that report, the medical inspection of school children is gradually supplying trustworthy information as to defectives of all kinds, and it thus providing us with a sound foundation upon which preventive and remedial measures may be built up. No general anthropometric survey of the children of the country is yet possible, but inspection, as far as it has gone, reveals a state of matters that is well calculated to create anxiety. We are told that of the six million children in the elementary schools of England and Wales, ten per cent. suffer from serious defect of vision, three to five per cent. from defective hearing, one to three per cent. from suppurating ears, eight per cent. from pronounced adenoids or enlarged tonsils, twenty to forty per cent. from extensive and injurious decay of the teeth, one per cent. from recognizable tuberculosis, and from one to two per cent. from heart disease. A percentage of children, ranging from 3·5 in one district to 26·9 in another, suffer from malnutrition, due to poverty, intestinal parasites, oral sepsis, rickets, or other causes, and are anæmic with a deficiency of red corpuscles in the blood, thin and under-sized. There are also a certain percentage of children who are physically defective, crippled, or epileptic, and altogether Dr. G. R. Kayes' calculation that there are at the present time 4,800,000 children who are unsound in body or mind seems to be well warranted.

As regards feeble-mindedness, it is interesting to note that the returns received by the Board of Education agree closely with the estimates of the Royal Commission, based upon examination in a few typical areas only. Following the data of the medical investigators, the Commission concluded that, in England and Wales, the number of mentally deficient children may be expected to be, in the areas urban and rural, 0·79 per cent. of the number of children on the school register, falling as low as 0·28 in a northern colliery district, and rising to as high as 1·12 and 1·24 in urban areas. Generally speaking, therefore, the percentage of feeble-minded children in any community varies from 0·25 to upwards of 1 per cent. This would yield a total number of feeble-minded children on the school registers of between 15,000 and 16,000. It is almost certain, therefore, that the estimates of the Royal Commission have been proved by the statutory medical inspection of school children in every part of the country, both in 1909 and 1910,

to be approximately correct. They estimated that there were 150,000 feeble-minded persons in England and Wales, of whom 48,000 were children in public elementary schools.

As regards feeble-minded children, the local education authorities are now in possession of information as to their number and condition, which should lead to their proper classification, and to the provision of suitable education. And the important point is that the education provided should be suitable, and have regard to the limitations and prospects of improvement of those for whom it is devised. The danger is that the education provided for the weak-minded will involve an outlay out of all proportion to the benefits which can possibly accrue from it. Owing to their helplessness, the education of the weak-minded always must cost more than that of the normal child, but humanity is inclined to lavish on them more than is really necessary, and it is deplorable to think that large sums are expended on the education of some of the feeble-minded who are ineducable, while other children of average intelligence, who would profit by education, are being reduced to feeblemindedness by poverty and malnutrition.

There are large numbers of the feeble-minded whose mental defect is irremediable and upon them costly educational energy should not be thrown away. There are large numbers who may be mentally strengthened up to a point, and who should have the benefit of such education as will make them harmless and practically useful. There are large numbers of backward children, who may be brought up to toe the line of average intelligence and who are entitled to ungrudging educational advantages, and beyond them there are large numbers of children not feeble-minded, not strictly speaking backward, but in various ways mentally abnormal, who are above all deserving of educational attention, combined with medical guidance, for they may be rescued from their abnormality, but if left to drift will go to recruit the various classes of degenerates who burden and afflict our civilization.

Children of this latter group, although perturbing many homes and well known to teachers whom they puzzle and harass, have not yet been made the subject of systematic study in this country, but in the United States they have been carefully observed and classified. They are there known as atypical or exceptional children, and are distinguished from abnormal children, including cretins, idiots and imbeciles of different types, and subnormal children, including epileptics, blind, deaf and dumb, deformed, paralytic and crippled children, and children suffering from arrested development and distinct mental defect.

The atypical children are of many different types, and present many

abnormal psychical traits. Amongst them we find children of morbid imaginative tendencies and lack of emotional poise, hysterical children, children with fears and obsessions, children without power of concentration, children without moral sense, children without will power, children with muscular tricks and tremors, children with trophic and vaso-motor disturbances. Children of any of these classes, whose atypical condition is due to neglect or adverse environmental influence, may, if left untreated, drop down into lower classes in the scale of development, may lose such normal characteristics as they possess, and degenerate into permanent defectives. It is a question of potentials and their direction. On the other hand, having the normal potentials, atypical children may be restored to normal equilibrium.

(*To be concluded.*)

MENTAL HYGIENE IN RELATION TO THE DEVELOPMENT OF THE CHILD.

By THEO. B. HYSLOP, M.D., F.R.S.E.

A Paper read at the Conference of the Child-Study Society, held in the University of London, May 11, 1912.

Some years ago there had been growing upon the people the conviction that we were not, as a race, so fit physically and mentally as we had believed ourselves to be, and, as is usual in such instances, the matter was referred to the consideration of the medical faculty. As the outcome, we had the report of the Interdepartmental Committee on Physical Deterioration, which report placed before us the problem of how to meet a symptom of more grave import than any question of poverty; and one of the remedies suggested was that of teaching the children how best to live.

On July 11, 1904, the medical profession of the kingdom approached the Board of Education by deputation to Lord Londonderry, and presented a petition, signed by upwards of 15,000 members of the profession, asking that hygiene and temperance should be placed among the compulsory subjects of elementary education. The reasons for making this advance in social instruction were briefly summarized in the petition of the profession, and were warmly approved and supported by the press throughout the whole kingdom, and their cogency was admitted by the Board of Education. The proposition of the medical profession was that the list of subjects in the code of the Board of Education for Public Elementary Schools should include hygiene and temperance.

They also issued a draft syllabus of instruction in the subjects, based on the methods already in operation in our colonies and army schools, in America, Sweden, Holland, Denmark, etc. At the same time they urged the necessity of giving the subject of temperance a prominent position.

The next step towards the promotion of the scheme took place at a well-attended conference of members of the medical profession, held at the Examination Hall, Victoria Embankment, on March 25, 1905. The late Sir William Broadbent, who presided, said that movement was initiated by a memorial signed by nearly 15,000 medical practitioners, followed by a largely attended deputation to Lord Londonderry, who, while expressing sympathy, showed that the teachers in elementary schools were not as yet qualified to give instruction in hygiene. The training of teachers and the provision of suitable books were, therefore, the first questions to be considered. Of the necessity for the inclusion of hygiene and temperance in the subjects to be taught in schools there could be no doubt. The State had undertaken the education of the children of the poorer classes, and had made attendance at school compulsory. It was, therefore, the duty of the local education authorities, to which this task had been delegated, to make the education given in the schools under their control efficient; and to be efficient the education must be such as would fit the children for earning their living and also influence their character for good. If there was one thing more necessary for that end than another, it was health, and with regard to that the parents of these children were, for the most part, at once ignorant and careless.

Following closely upon this, representatives of the National Union of Teachers and the medical profession held a joint and private conference in London on June 6, of the same year; and many valuable observations, both for and against the scheme, were made. The executive of the National Union of Teachers passed a resolution to the effect that, having regard to the present crowded condition of the curriculum and to the impossibility of omitting any of the subjects for which, in public opinion, importance is properly claimed, they did not consider the adoption of the scheme to be practicable. They also thought the advocacy of total abstinence would not prove acceptable to certain classes of parents, rate-payers, and local educational authorities.

With regard to the latter objection, it was to be deplored, not answered. The implied increase of work for the children is, however, worthy of some consideration, but I agree with Dr. Kenwood, the Professor of Public Health at University College, that this is not an insuperable difficulty; and since then, the Board of Education has not only appointed medical men as advisers, but it has also issued a careful

and detailed syllabus on the teaching of hygiene and temperance, and needless to say, this is more than half the battle gained.

Surrounded as we are by reports of the existence of physical and mental deterioration, it seems right and fitting that the country should be fully alive to all questions affecting the welfare of its people, and with this awakening to the necessity for, and the probability of, improving the national physique, I am in complete sympathy. But as a member of the medical profession, and as one who has to do mainly with the mental aspects of the people, I am alive to the dangers of adding to our burdens of education; and, more important still, to the dangers of cultivating a knowledge of self which is apt to lead to unnecessary timidity and a train of evils which are far-reaching in effects. There is no doubt whatsoever but that we are as a nation becoming extraordinarily solicitous as to our own bodily welfare. In times gone by, the Anglo-Saxon was characterized by his hardihood, by the simplicity of his life, and by his mental and physical vigour. How many people nowadays, when they rise in the morning, omit to examine themselves in the looking-glass in order to satisfy themselves that they have a look of health? They are usually so fully conversant with the symptoms of ill-health that at the slightest indication of a bilious hue of conjunctiva, furring of the tongue, or a general feeling of anergia, they run to the cupboard near at hand, and resort to the use of one of the numerous remedies which they have assiduously accumulated.

When we turn to our morning paper we find all the latest quotations on uric acid, bile, and tremours, and whole columns of proofs as to the infallibility of certain nostrums. Wherever we go, and whatever we read, we cannot escape from the melancholy details of symptoms of disease set forth in large type for our especial edification. No wonder is it, therefore, that all sorts of quackeries and impostures have increased by such leaps and bounds that the amount expended upon their consumption is enormous. From my experience of life as a physician, I believe the people to be, as a whole, absurdly timid; and *it is to the acquisition of a pseudo-knowledge of their own bodily functions that they are almost afraid to live.* It is needless to say, therefore, that I am not in sympathy with any teaching which is not wisely and temperately directed.

In making this statement I of course refer to the amount to be taught to the children. The amount of instruction essential or advisable for the instructors is quite another matter.

It is true that "the hand that rocks the cradle rules the world." Woman, instead of being a mere breeding machine, in antithesis to man as a working machine, stands at the summit of the propelling forces

which lead to evolution or devolution of our race. To woman is accorded by nature the responsibility of giving birth to the highest evolved manifestations of nature, namely, human life. Upon her rests the care of moulding the young and growing spirit which obtains its trend not only from its mother's influence and example, but also through the subtle laws of heredity. The earliest years of life are fraught with the tenderest recollections, and to the mother's influence can be traced the formation of *habits* of conduct and of conscience which persist throughout life, and which can never be excelled by the later teachings of any system of moral philosophy or even of religion.

To heredity and to the early years of parental influence I would ascribe the greatest power for good or ill in the establishment of health and character.

The subsequent unfolding of the mental faculties will follow in due course. It has been said by many notable people that they themselves were not constituted to be criminals owing to heredity and to the fact than when they departed from the dictates of habit they suffered torture. Thus habit becomes not only one's own law and compels one to be true to one's self, but it is also one's own executioner. This means, philosophically, that habit, as such, imposes restrictions and punishments which may be observed and feared respectively. It is needless to say that the fundamental laws of truth, faith, hope, and charity, combined with all that goes to make up what is known as justice and lovingkindness, are in childhood better instilled and infinitely more lasting than are any later teachings or legal restrictions.

The same holds good with regard to the habits of mental and physical health. It is not so much to knowledge as to *habit* that we should pay attention in the early years. A little knowledge is a dangerous thing, but the cultivation of a good habit is an insurance against danger. To mothers, therefore, are given the opportunities of imparting habits of mind and body which far exceed in power the influence of Church, State, or medicine.

The habits of cleanliness, performance of bodily functions, temperance in eating and drinking, and all the various factors which are comprised under the term "hygiene" should be part of the *development* of the child, and *none of these elementary conditions should require or necessitate the displacement of any of the subjects now taught in schools.* In order, however, that this should be carried out effectually, it is absolutely necessary that teachers should have definite and reliable information upon the subject of hygiene.

When children have reached the age of twelve or thirteen years it may be necessary to supplement or even displace some part of their

instruction by giving them class-room demonstrations of hygiene and temperance.

I have already in my remarks on the prevalence of degeneration led up to the questions: (1) At this stage of our history has education or book knowledge in itself effected what it was designed to do? (2) Which is really of primary importance to the nation, education as we now know it, or mental and physical health? The answer is to me very definite, and I say that the time has come when we ought to bring our united strength to bear upon this problem of health. It is a more urgent need than that which existed in 1870, and it rests with those in authority to face the music and decide whether they will give way to necessity or pursue a policy which can only help on to disaster.

Manifestations of the Unstable Brain.—Dr. Hughlings Jackson, that pioneer of thought pertaining to evolution and dissolution of the nervous system and the mind, has clearly pointed out that there are two factors for consideration in every form of degeneration, viz. the faulty construction, and the inability to perceive the faultiness of the construction. In the insane, the incoherent nonsense, the hallucinations, the delusions, and the irrelevancy of conduct are all in themselves positive symptoms due to false constructions; but they are of comparative insignificance as compared with the factor of disease or defect which prevents the individual from *knowing* their falsity. Owing to the conglomeration of barren facts in the memory of the individual, to the imperfect development of the various paths of recall, and to the want of systematic organization of the reasoning processes which serve to digest and combine the facts into a coherent whole, the minds of the present generation are unstable, easily upset, and prone to fail when any degree of strain is put upon them. As it is with an individual, so it is with a nation; when deterioration sets in, it manifests itself first in impairment of the highest evolved, most recent, and therefore least stable of its acquisitions. The brain of the nation is now taxed to excess, and it is the brain of the nation that is showing such formidable signs of decay. The positive symptoms of apparent progress are of little diagnostic significance, except when compared with the evidence of a negative lesion or enfeeblement which saps the foundations of all that is forcible and effective in the vitality of a nation.

I now maintain that our educational system of endeavouring to force all brains to a high standard of competency is not only in itself based upon a false principle of economy, comparable to flogging the already jaded horse, but the methods themselves are not only often useless and unprofitable, but actually deleterious. We all of us develop

our bodies by combination of efforts; this is development, as opposed to mere growth in bulk from the ingestion of food. Education, as we know it, however, strives mainly for the attainment of mere growth, and neglects the mental combinations which favour development. Selection is the very keel on which our mental ship is built, and so, in the building of a mind, selection is the one point of paramount importance.

Space will not permit me to follow step by step the development of the mind-complex. I merely state that all mental development, if it is to be rational, organized, stable, and able to resist the wear and tear of life, must be based upon the heaven-bestowed power of reasoning. Every combination should be fixed in the form of a syllogism. The logical faculty with which we start life should be cultivated, amplified, and corrected assiduously, until the processes of thinking correctly become so stable that no mere incidental stress or strain can possibly warp or overthrow them. It will readily be conceived that repetition, and all the farcical attempts to cultivate mere memory, result in nothing more than an unstable growth or deposit. From defects and false combinations of these deposits, we get positive symptoms which, however, would not amount to insanity were the reasoning power still maintained. It is, therefore, to the development of the reasoning power, and to that mainly, that true lasting power of mind is to be traced.

Now, not only does repetition by rote and cramming the memory with useless material take up much of the available time of our children, it also saps their energies by waste of effort, and does much to retard the sound organization or combination of brain activities. Logic and the power of reasoning is only too often delayed or given merely as a top-dressing in the cultivation of the intellect; and, as the most recent and least stable of the acquisitions, it is therefore the first to degenerate. This is absolutely true, not only of the individual, but also of our race. What we are losing by instinct we are supposed to be gaining by reason; but, alas! our so-called "reason" is on the verge of a reversion.

The last problem to which I shall refer is one which requires very careful and delicate handling. My experience as a physician is that in every normal person there exists a reproductive system which has its phases of evolution and various psychological and physiological phenomena. Unfortunately ignorance of sexual functions and the absence of timely warnings as to their proper control, etc., have proved to be the origin of life-long troubles to many. It is always a grave problem to the schoolmaster and to the parent as to how much instruction in these matters should be imparted to children. I, for my part, believe that some instruction and guidance given by medical men to the senior pupils of schools would be of benefit, not only to these pupils themselves,

but the precepts would permeate throughout the younger classes and save much of that which leads to deplorable results both in the individual and in the race.

THE EXPERIMENTAL STUDY OF MEMORY.

By BEATRICE EDGELL, M.A., Ph.D.

A Lecture given before the London Child-Study Society, March 28, 1912.

Before speaking of the experimental study of memory it may be well to preface what is here understood by the term "memory." The word is often used in a very wide sense as the synonym of "retention," the influence of past experience on the present. It was memory in this broad sense which Prof. Hering claimed as "the universal function of all organized matter." Wherever there is life with growth and development, there he would predicate memory, since every new process is the outcome of the old, every increase is built out of what has gone before and implies its retention.

This is memory in what one may term the "biological" sense of the word. Our whole life is witness to it. Nowhere is it more evident than in the phenomenon of "habit" or again in that of "practice." That successive repetitions of an action should render this action so easy, its performance so mechanical whenever occasion arises, that often there is no conscious realization of it on the part of the agent, this would be impossible were it not that each occasion leaves what we call its "trace" behind, *i.e.* is retained. Similarly, the advance in skill or facility of any kind which we call "practice" implies that the effects of past efforts persist and that each new effort is re-enforced by the effects of the old. Were it not so, practice could never make perfect. Memory, as it is used in the title of this paper, does not stand for the fundamental principle of retention, but for a much more restricted fact of conscious experience, viz. the reference back to past experience, as past. Experience is not merely retained, but reproduced with the consciousness that it belongs to the past. To remember means to refer back. It may be an actual re-experiencing of the past as in reminiscence, or it may be the conscious interpretation of the present by the light of the past.

It is convenient to distinguish Immediate Memory from Mediate Memory or Suggested Recall. In the former a re-experiencing takes place immediately after the experiencing, *e.g.* at the play one may close one's eyes and see again the scene upon which the curtain has just fallen, or after the last notes of a song one may hear again the singer's

voice singing the closing words. Mediate Memory or Suggested Recall is the form of memory with which we are most familiar. Something in the present suggests the past, either in that it serves as an incentive for re-experience or in that it requires a conscious recall of the past to enable us to deal with it, to explain or act upon the given. Different from either is the experience termed Persistence. It is unlike Suggested Recall in that the reproduced ideas come unbidden, *à propos* of nothing in present consciousness. It is unlike Immediate Memory in that the ideas do not arise at once at the close of some experience, but some little time afterwards, usually when there is no special task or interest engaging consciousness, *e.g.* when we go to bed and fain would sleep. Every one, I suppose, knows what it is to be haunted by a tune, to hear over again scraps of conversation in which one has taken part, to see slides or charts with which one has been occupied during the day.

The experimental study of memory may be described as a study of the conditions of retention and reproduction of past experience in any of these forms. I cannot give an adequate account of such a big field of research, but I have tried to select some of the topics which I hope may prove of greatest interest.

I. Economical Learning.—The study of the problem of Economical Learning has been pursued in different directions, *e.g.*—

(A) *Method of Learning.*—Given a certain amount of material which has to be committed to memory, what is the best way of attacking it? This question was first taken up by Miss Steffens in Prof. Müller's laboratory at Göttingen, the laboratory to which we owe many important researches concerning memory. Like other problems this one had been suggested by Ebbinghaus' work "Ueber das Gedächtnis" (1885). Miss Steffens set seven grown-up persons the task of learning poetry, Byron's "Childe Harold." This poetry each person learnt as he pleased, saying it aloud in Miss Steffen's presence, in order that she might take note of how it was learnt. She tried the same experiment with a boy and a girl. Although each person had his or her individual peculiarities in learning, there were certain general points of agreement. Every one broke up the nine-lined stanza into parts; in learning a new part every one went back from time to time and repeated the part or parts already learnt. Every one gave far more repetitions to the earlier lines than to any subsequent portion. Difficult bits were picked out and given special repetition. Miss Steffens also noticed that the adults learnt by trying to say what they knew and correcting the mistakes, whereas the children were content to go on repeating and repeating from the text.

Choosing other stanzas which were as far as possible of equal

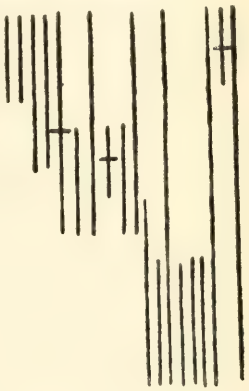
difficulty with the first, Miss Steffens then set her subjects to learn according to a prescribed method. Each stanza was to be read through as a whole, and repeated from beginning to end without any attempt at breaking it into parts or any selection of difficult bits. To their surprise the subjects found that they learnt more quickly when following out this method than when following their own devices. The average time for a stanza learnt by the method was 2 minutes 47 seconds as against 3 minutes 3 seconds. The same procedure was carried out with nonsense material, with the same result. By nonsense material is meant series of syllables, each consisting of an initial and a final consonant with a middle vowel, so chosen that no one syllable stands for any word, and so arranged that no word is formed by their combination, *e.g.* tac-lil-sof-neb, etc. This material has been used very largely in memory experiments, since it possesses the advantage of being free from helping or hindering associations, and of being sufficiently uniform in character to allow comparison of the result of one experiment with that of another, a comparison which is difficult when working with the material usually committed to memory. For instance, in Miss Steffan's experiments it might be easy to say that the superiority of the second results over the first was due to the fact that the stanzas learnt by the method were easier than those learnt without it. This method of learning is known as the Global method or the "G" method, learning by wholes (German, *Ganze*), as distinguished from the piecemeal learning of common practice, called the "T" method (German, *Teil*).

The results obtained by Miss Steffens have been confirmed by other investigators, by Miss Ephrussi and by Meumann and Ebert, who have made extensive experiments with school-children. It has been shown that the economy of the method lies not only in the saving of time during learning, but also in the more enduring character of the resultant. There are psychological reasons why the "G" method should be the more economical one: (1) The learning is assisted by the mind having before it the whole as a whole,—if the material is sense, the logical relations of part to part will aid in forming the necessary associations; (2) attention in learning moves forward from point to point, following the same order which it will be required to follow in reproduction; (3) unnecessary associations are avoided. In piecemeal learning the beginning and end of each section are associated together through repetition, although this relation is quite unnecessary for subsequent reproduction. Dr. H. J. Watt, in his little book on memory ("The Economy and Training of Memory"), says that in learning 100 lines of Pope in couplets, 198 associations would be formed, of which only 100 are necessary for reproduction.

The practical value of the "G" method is very great, but it is important to notice the circumstances under which it requires modification. Miss Ephrussi found that when the matter to be learnt was unfamiliar, the subject learnt more quickly by the "T" method; the subject becomes more readily at home with the material by the successive repetitions of each piece than by the repetition of the whole. Again, if a piece is uneven in difficulty, it is advisable to stop the repetition of the whole when the learning has proceeded some way, and to give special repetitions to the points of difficulty, and then to resume the "G" method. Lastly, if the matter to be learnt is long, it is impossible to go through the whole with unflagging attention. A pause should be taken at any convenient point, so that in reading through the whole, rest at this point will allow attention to be readjusted, and concentrated afresh for the remainder of the task. The following tables will serve to illustrate some of the results of the "G" and "T" methods:—

TABLE I.—UNCONTROLLED LEARNING IN PARTS (STEFFENS).*

To horse! To horse! he quits, for ever quits	1.
A scene of peace, though soothing to his soul:	2.
Again he rouses from his moping fits,	3.
But seeks not now the harlot *and the bowl.*	4.
Onward he flies, *nor fixed as yet the goal*	5
Where he shall rest him on his pilgrimage;	6
And o'er him many changing scenes must roll,	7
Ere toil his thirst for travel can assuage,	8.
Or he shall calm his breast, or learn experience sage.	9.



"Childe Harold," I. 28.

TABLE II.—AVERAGE NUMBER OF REPETITIONS WITH "G" AND "T" METHODS (MEUMANN).†

Subject.	"T" method.	"G" method.
8 year old boy	17 rep.	11 rep.
	15 ,,	10 ,,
(Goethe's "Erlkönig," 1 verse.)		
Adult	33 rep.	14 rep.
(Schiller's "Dido," 2 verses.)		

* Steffens, "Exper. Beiträge zur Lehre v. ökonomischen Lernen," *Zeitschr. f. Psychol. d. S.*, Bd. xxii., 1900, p. 324.

† Meumann, "Ökonomie u. Technik des Gedächtnisses," pp. 198, 203.

TABLE III.—COMPARISON OF "G" AND "T" METHODS WITH "UNFAMILIAR" MATERIAL (EPHRUSSI).*

Subject.	"T" method. No. of Right Answers.	"G" method. No. of Right Answers.
S.	25%	15%
W.	25%	13%
(18 pairs of Russian words, with German equivalents. 16 repetitions.)		
K.	64%	44%
(12 pairs. 9 repetitions.)		
K.	(*a*) 47% (*b*) 37%	36%
(8 pairs (*a*) repeated 2 at a time ; (*b*) repeated 4 at a time.) 9 repetitions.		

TABLE IV.—COMPARISON OF "G" AND "T" METHODS WITH "FAMILIAR" MATERIAL (EPHRUSSI).

Subject.	"T" method. No. of Right Answers.	"G" method. No. of Right Answers.
M.	61%	77%
(8 pairs of German words and numbers, 12 repetitions, 8 experiments.)		
C.	30%	45%
(8 pairs, 12 repetitions, 8 experiments.)		
S.	42%	38%
(8 pairs, 12 repetitions, 12 experiments.)		
	58%	64%
(8 pairs, 12 repetitions, 12 × 2 experiments.)		
	41%	47%
(8 pairs, 6 repetitions, 8 × 2 experiments.)		

(B) *Distribution of Repetitions.*—This is another investigation which was suggested by the results noted in Ebbinghaus' treatise. Given that x repetitions are used to learn certain material, how should those repetitions be arranged? Shall they all be taken at one time, or shall they be spread out as much as possible? Adolf Jost worked at this question under Professor Müller, and his conclusions have proved of great practical value. He found that the greater the interval over which the repetitions could be spread, the more effective the repetitions proved.

His experiments led him to formulate two hypotheses as to the "ageing" of memory ideas. (*a*) That if two associations are of equal strength but of different age, a renewal has more effect on the elder than the younger ; (*b*) that if two associations are of equal strength but of different age, lapse of time affects the elder less than the younger.

* Ephrussi, "Exper. Beiträge zur Lehre v. Gedächtnis," *Zeitschr. f. Psychol. d. S.*, Bd. xxxvii., 1905, pp. 86, 87.

TABLE V.—PROGRESS OF FORGETTING IN THIRTY DAYS. RAPID AT FIRST, SLOW LATER. FOUR GROUPS OF SUBJECTS (HENDERSON).*

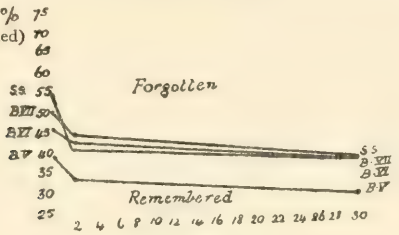


TABLE VI.—COMPARISON OF THREE DISTRIBUTIONS OF TWENTY-FOUR REPETITIONS (JOST).†

Subject.	Kind of series.	Number of Right Answers.	Time of response.
B.	8 rep. on	18	2496σ
M.	3 days.	7	2429
B.	4 rep. on	39	2213
M.	6 days.	31	1570
B.	2 rep. on	53	2007
M.	12 days.	55	1675

The table shows results with what is known as the "Scoring Method." Each subject learnt six series of twelve syllables according to each type of distribution. The syllables were learnt in trochaic rhythm. In the test the subject was shown a stressed, and asked to respond with the following unstressed syllable. The interval between the exhibition of the stressed syllable and the subjects' response was recorded by means of a Hipp chronoscope, which shows thousanths of a second (σ). The hands of this clock can be set in motion through the closing or breaking of an electromagnetic circuit, and can be arrested in the same way. The circuit was so arranged that it was broken as each syllable came into view, and as the subject responded, the movement of his jaw reclosed the circuit by means of a lip key. The readiness or tardiness with which the subject supplies the following syllable has been found to be a valuable index of the strength of his associations. Reference to the table will show that the average time of response decreases with greater spread in the distribution of repetitions.

(*To be continued.*)

* Henderson, Monograph, Supplement V., *Psychological Review.*

† Jost, "Die Assoziations festigkeit in ihrer Abhängigkeit v. d. Verteilung d. Wiederholungen," *Zeitschr. f. Psychol. d. S.*, Bd. xiv., 1897, p. 452.

ADOLESCENCE.

By Sir THOMAS CLOUSTON, M.D., LL.D.

(*Continued from page* 8.)

If we turn now from the merely anatomical view of the brain cell to its functional activity during adolescence, we find ourselves on much surer ground. From birth up to puberty there has been a continuous development of the co-ordination of muscular movements with the action of the brain cell. This co-ordination has been steadily developing, but is yet far from being perfect. The boy and girl have learned to play games, to draw, to paint, and to play musical instruments, but all those have not usually attained a very high point. Golf, tennis, and cricket have not acquired absolute accuracy; painting and playing the piano have not been able to express the ideals of feeling and soul. There is yet something wanting in all these co-ordinations. If the brain-vehicle of the higher feeling and the higher and subtler imagination has not arrived at perfection, it is obvious that it cannot manifest itself in perfect muscular expression. The educative process is still going on, and needs practice, guidance, and direction. The highest and most important hereditary tendencies for good or evil have not then exhibited themselves. The individual similarities, differences, and peculiarities have not then fully come out, and especially the higher sex differences have not appeared. The great function of reproduction has not come in to colour body and mind. It is then that we find the first appearance of certain hereditary nerve instabilities such as hysteria, neurasthenia, and mental disease. The strength and the qualifications to reproduce and rear the race then develop rapidly as adolescence advances. The higher intensities of feeling, imagination, and action, are then seen for the first time. Fancy is transformed into constructive imagination, sentiment then becomes really ideal and poetical. The higher morality and religion become possible because their brain vehicles are then provided. A taste for and appreciation of the higher kinds of literature then appear, and slowly grow if the proper pabulum for them is provided. A more intense consciousness of self, a larger ambition, a pronounced altruism are then seen. The longing for new discoveries and the efforts to attain them become a dominating impulse. Adventure in the man, and the protective instincts, sympathizing, nursing, mothering, and teaching, dominate the woman. Love between the sexes becomes the most intense of passions; the sense of right and wrong and of duty become an active principle. "Character," that complex

sum of all the faculties, is then being crystallized. The purposes of life are then shaped. Idealisms, peculiar to each sex, instead of being inchoate as they are in the boy and girl stage, then take definite and practical forms. Adolescence has always been a favourite hunting-ground and subject of study and depiction by the masters of fiction and the drama. We find in Shakespeare, Fielding, Thackeray, Dickens, Meredith, and George Eliot, perfect pictures of the period. Romeo, Tom Jones, Pendennis, Richard Feverel, Gwendolen, are all true to nature. "Richard gave up his companions, servile or antagonistic, he relinquished the material world to young Ralph and retired into himself, where he was going to be lord of kingdoms, where Beauty was his handmaid, and History his minister, and Time his ancient harper, and sweet Romance his bride; where he walked in a realm vaster and more gorgeous than the great Orient, peopled with the heroes that had been." David then goes out to slay Goliath. The beginning of this period is the true test of the capacity of the school teacher; its middle period, of the University professor; and its latest period, between eighteen and twenty-five, is the true measure of value of the social environment, of the professional training and of literature and religious teaching as formative influences. Whether a man or woman is to be a success in life depends on the innate quality of the brain cell, and the environments to which, during adolescence, it is subjected.

I may say here that when I use the word "environment" I employ it in the modern scientific sense of comprising everything outside a living being that has any relationship whatever to it. It includes in that way the air we breathe, the objects we see, the sounds we hear, the food we taste, the men and women who surround us, the books we read, the social atmosphere we live in; in fact, all things in the heaven above and the earth beneath which consciously or unconsciously affect us. It is manifest that as regards our modern civilized life and its conditions, the true test of whether they are tending towards a higher evolution is whether they are fitted to build up a human society better and more permanent than what has existed in the past. Standing still means going backwards. For this purpose it is evident we must look chiefly to an advancement of the higher moral and social qualities. In the past ages there has been plenty of fighting, outward struggles, and adventure. The keenest wits and the most intense efforts have been used to acquire new territory, to get the better of opponents, and to overcome outward opposition. Individualism has done its best to acquire power, to use for its own purposes and to keep down the inferior in body and mind. Political intrigue, Machiavellianism, and rude force have without scruple kept down the weak, the unfit, and the

uneducated. The lessons and examples, hitherto for the most part experienced by adolescence, have been in this direction. It is for the teachers and the society of the future to raise and to broaden those examples and lessons and to make them such that they shall become the permanent possession of humanity. Mere individual acquisitions may not be transmitted, although they have been of immense importance. It is the further permanent evolution of the higher races of man that we have now to strive to attain.

Heredity is too large a subject to treat of it in its scientific aspects in a paper of this kind, but we cannot omit consideration of general facts in regard to it. The opinion of some of the best known writers on heredity has lately been that personal experiences are not transmitted to posterity. No doubt this law applies in a general way, but I cannot see that the evolution of living beings in the past could possibly have taken place except through the hereditary transmission of higher qualities bodily and mental. There is rapidly rising up among us a new race of scientists who believe that the higher qualities of man can be made still higher through the rules and practice of the new science of Eugenics. Galton's studies in heredity in this direction cannot, in the future, be disregarded by scientific men. That science is founded on the assumption that those higher qualities can be transmitted and increased through the practice of the laws of heredity.

The theory of heredity as carefully elaborated by Weissman virtually excludes the effects of environment as transmissible qualities to posterity, but when we come to apply those principles to mental qualities and to the higher brain cell, most of us find them to be too mechanical. We are not much helped by Dr. Archdall Reid in his "Laws of Heredity"—important though that book is in many ways. Even Darwin's "Variations" and their effects do not somehow or other seem to explain the facts of mental heredity. Absolutely new and specialized qualities developed in an individual through his environment may not be transmissible to his posterity, but all the things we would like to see strengthened in mankind already exist in some form or other. They are not new things. Inhibition, altruism, moral sense, brain stability, the higher social instincts and the religious instinct already exist in nearly all men in some degree or other. What we want is their further development and universal diffusion among mankind. This strengthening and spreading is absolutely consistent with the hereditary laws laid down by Weissman, and with all the facts adduced by Archdall Reid, if the beginnings already exist. Modern science has clearly shown that, at all events in the lowest forms of life, environmental influences produce changes in the individuals that

are transmitted to posterity. The latest studies in heredity, as expounded by Hertwig, prove that, in some animals, at least, the germ plasm is not dissociated from the soma; that is, the body minus the germinal parts. He found that in certain animals every part of the body has germinal qualities, and so could reproduce the whole organism, germ and soma combined. No biologist denies that the soma, at all events, can be influenced in its essential characters by environment. The facts which we know as to barbaric races becoming mentally changed so that they take their places among the civilized part of humanity, as to the domestication of wild animals, as to the changes in the food instincts of animals when the supply of their ordinary food fails, and they are compelled in order to subsist to take to other kinds of food, this becoming hereditary in their descendants—all those facts point to environmental mental changes being transmitted to posterity. As Maudsley eloquently says, "The opinion that an elementary particle of a bodily unity, specialized for reproductive purposes, lives in physiological seclusion is directly contrary to the whole trend of scientific inquiry which goes to show that when one organ suffers or joys all the organs suffer or joy more or less with it, being members of one body and members one of another."

It is important in considering this all-important question of heredity to consider in detail the diverse influences that go towards the perfecting of a brain cell. Its primary quality is, as we have seen, its innate capacity to develop into higher and higher function from birth to maturity. The influences which so develop it may be summarized by the term "stimuli." If by heredity the brain is so constituted that it cannot respond to its proper stimuli, then we have resulting a condition of want of mind, of idiocy, irremediable and unalterable, no matter what stimuli it is subjected to. This is fortunately a rare condition, only occurring in about one in every eleven hundred of the population. The common stimuli to the nutrition of the brain cell are good food, air with an abundance of oxygen, muscular exercise, and a sufficient blood supply, with an efficient brain drainage system to remove at once the used-up and effete matter which by its metabolism it has produced. The other stimuli chiefly come through the senses—harmonious sights, sounds, tastes, and odours. The brain cell of normal heredity and constitution, if it has been in childhood deprived of those stimuli, as in the case of a child who is deaf and blind and speechless, remains undeveloped in function and its possessor is in a state of virtual idiocy. This was the case with Laura Bridgeman and Helen Keller, but both of these girls when their brain cells received the proper stimuli, in their cases though touch alone, underwent a rapid development so that they

became mentally acute and normal. It may be assumed in the case of every cell except that of the idiot, that, given the proper stimuli they will exhibit normal mind. The extent to which that mind may be developed cannot be determined in any case beforehand. After mental action is established thought and emotions become intense stimuli to further development.

In the discussion of this question of the development of the brain cell and its heredity we must take into account as a very important factor the conscious subjective feeling of pleasure or of organic satisfaction which all normal stimuli, all suitable environments, and all exercise of function, mental and moral, produce. This law may be put in two ways: all environments that are harmonious produce pleasure or organic satisfaction; or all pleasures or organic satisfactions are good for the brain cell. It is certainly true, with certain qualifications, that whatever gives us pleasure is good for us, or whatever gives us pain or dissatisfaction is bad for us. Educationalists of late years, taking advantage of those biological and psychological laws, have endeavoured to make educative processes agreeable and pleasure-giving. If this can be done consistently with thoroughness, there can be no doubt that it is the right method. The scholar who is educated in such a way that he is unhappy, irritated, resentful or uninterested, will certainly not make the progress that he would have done under opposite subjective conditions of feeling. The pessimist, the man who does not enjoy life, the man to whom "nothing matters," is usually in ill-health or has a bad heredity. This whole question of pleasure, joy, enthusiasm, keenness, is of tremendous importance during adolescence. Adolescence is abnormal by heredity or by environment if those conditions do not exist and act for good all during its course.

But it will naturally occur to many people at this point, if those principles you are laying down are correct, where does self-control come in? Does not its exercise, in many cases, imply dissatisfaction and interference with pleasure? Does its exercise really hurt or help the brain cell? If life is a continuous series of acts of self-denial, would that be a normal or healthy state of matters? The true reply to this question is that given by Spencer. All normal acts of inhibition, of self-denial, and of altruism, if the education has previously been of the right sort, *will give pleasure*, and pleasure of the very highest kind, through the after-satisfaction that acts of duty always produce; in fact, the way to attain *the very highest pleasures* and satisfaction is through such inhibitions and through them only. We must of course divide pleasures into various kinds and qualities. The pleasures of a good dinner, of sitting in the sunshine, of meeting a friend, and of

denying one's self a glass of wine to help a weak brother are all good of their several kinds, and are all stimuli to the higher brain cell. It is only when acts of inhibition are practised for no object whatever except to strengthen the faculty, in fact, when they are a mere mental gymnastic, that their frequent use may be questioned. Physical gymnastics always have the results of improved muscle, better appetite, richer blood, and better sleep. Inhibitory gymnastics, like fasting, self-denial with no objective results, etc., may even be harmful. The mental and moral gymnastics of an Indian fakir or a Simeon Stylites are in their essential meanings selfish and without any real moral benefit to the individual or to mankind. There are plenty of ways of developing the inhibitory faculty in the ordinary course of life without resorting to such methods which are in their essence pathological, for adolescence has, like the other epochs of life, its strong and weak points. Its strongest point is vividly put by Stanley Hall when he calls it "a new birth." Not only does the brain cell undergo a higher development and integration, but there is not a bodily organ or function, a sense perception, or a mental faculty that is not accentuated or changed in some way during adolescence. It may be said that up to adolescence a human being is developing animal, bodily, and, so far, lower qualities, common to mankind and the higher animals; while during its course the distinctively human and higher mental, moral, and social qualities come in and gradually reach perfection. It is not only a new birth but also a real "crisis" in life. The things learned in adolescence are more thoroughly learned than in boyhood, and are not forgotten. There is a plasticity, a hunger for knowledge, and an enthusiasm that are not seen at the other periods of life. Originalities of all sorts then show themselves. Genius, that rarest of all human qualities, then begins to be manifested.

But then adolescence has its weaknesses, its dangers, its failures, and its special diseases. This my professional opportunities and studies have given me more chances of observing than even its strong points. Though the abnormal in humanity is fortunately far less frequent than the normal, yet it is necessary to study it because it suggests precautions, counteractive measures, and what we call in medicine "prophylaxis." The pathological is sometimes only the physiological in excess, a study of the one throws light on the other. While hereditary strong points, such as those I have described, undoubtedly come out in adolescence, yet it is a fact, and a most important one to remember, that it is at this time that a great many hereditary weak points appear for the first time. A study of such diseases has shown me that certain nervous diseases are most apt to appear in childhood, certain others from seven or eight years of age up to fifteen, and certain others during

adolescence. It is during the adolescent period that hysteria, epilepsy, asthma, dipsomania, megrim, neurasthenia, and a form of mental disease which I call "adolescent insanity" are the most apt to appear. In addition to those which come within the category of marked disease, there are many minor pathological, mental and moral conditions which are first seen at that time of life. These consist chiefly of perversions of the moral sense, of volition, uncontrollable impulsiveness, tendencies to law-breaking and crime, unteachableness, stupidities, incompatibilities of temper, unfounded aversions to relations, frothy religionism, impracticabilities of all sorts, perverted sexual and reproductive instincts, morbid pessimism and melancholy, loss of the normal love of life, suicide with failures to preserve and protect life, morbid and dangerous ideas of adventure, abnormalities in the social instincts consisting either of exaggeration or paralysis, eccentricities, and all sorts of perverted and irregular directions taken by the religious instinct.

The chief difficulty in regard to this formidable list of adolescent dangers is to estimate their real significance. So many of them are exaggerations of the normal characteristics of the period that it is difficult to tell where the normal ends and the abnormal begins. To antagonize and treat some of them is a matter also of extreme difficulty but of the last importance. One important indication of whether those things are of the nature of disease is to examine closely the nervous heredity of the ancestry. We find it to be a law affecting such cases that a lesser nervous or mental defect or peculiarity in the fathers or mothers tends often to come out in the children in a more marked degree or a worse form if the marriages have not been counteractive. It is no doubt difficult for educationalists to get at the facts of heredity, and many of them would say that this is not specially their business. I think a way out of this difficulty will now be found through the intervention of the school doctor, and it is one of the many helps which that official will be to the teacher and to education. After defects of eye and ear, teeth and chests have been looked to, I think the mental condition of the scholar and his heredity must come in. I mean that not only apparent and obvious imbecility and backwardness will be looked for, but a more careful analysis will be made of the mental condition of our school children so that the minor and nascent defects will be detected. And here I would say that one of the duties of the school doctor of the future, to which no attention has been paid as yet, will be to find out not only the specially weak and defective among the children, but also to sort out the specially strong and effective. I can imagine it to be of great value for an enthusiastic teacher to be told by the school doctor, "Now, So-and-so has a first-rate heredity, is strong and resistive both in

body and mind, and has lots of staying power, so that you can apply any pressure you like without running any risk." It might help to break the dull uniformity of educational codes to have a recognized class of non-damagable brains, a kind of "fool-proof" class that will not suffer harm by any mode of treatment.

It is no doubt the duty of every intelligent teacher to ask the question in regard to every manifest defect or peculiarity, every persistent tendency to disobedience, to truancy, to disorder, or failure to fall into school routine, "Is this due to the brain condition of the child or to mere moral defect?" The same question should be asked by the teacher in the secondary schools and by the professor in the university in regard to those and other more subtle, mental, and nervous conditions. It is one of the most marked normal peculiarities of adolescence to exhibit a want of respect for law, a contempt for age, and a resistiveness to routine. Such law-breaking as ends in criminality is found by statistics steadily to increase from the age of twelve to twenty-five. Over eighty per cent. of all those indicted for first offences are under twenty-five, and, if our criminal statistics are correct, juvenile crime is on the increase in all civilized countries. That is what we might expect on psychological principles. The early stimulation of every human brain through compulsory education tends undoubtedly towards the premature development of this physiological lawlessness before the counteracting power of mental inhibition is evolved in the brain. This is a powerful reason why measures for educating control should go hand in hand with those for educating the intellect. It is a well-known fact that where there is a bad nervous or mental heredity, lawlessness is more apt to appear than in the adolescent with a normal heredity.

ALFRED BINET (1857–1911).

By Prof. ED. CLAPARÈDE.

Translated from the "Archives de Psychologie" *by the kind permission of the Editor and Author, Prof. Ed. Claparède, by* Mary Louch.

(*Continued from page* 24.)

But I cannot here review all Binet's works. His activity was so abundant, he took up so many different subjects, that an account of his work, at once chronological and systematic, is impossible. While absorbed in questions of mental aberration, he was making studies as deep as they were original on the psychology of art (*Le mystère de la*

peinture and *La Psychologie artistique de Tade Styka* (*An. ps.* 1909); *Rembrandt* (*An. ps.* 1910), on the nature of *emotion* (*An. ps.* 1910); and he was, moreover, finding time to write dramas, many of which were represented on the stage of the Grand-Guignol, at Paris. In 1905, at the very moment when he was working out his Scale of Intelligence, and when he appeared to be completely engrossed with the ministerial commission, in connection with which he went through the severe trials mentioned above, he yet had enough mental freedom to attack the most arduous problem of metaphysics, the old problem of soul and body (*L'âme et le corps* (Paris, 1905); *Esprit et Matière* (*Bul. Soc. fr. de philos.*, March, 1905); *Cerveau et pensée* (*Arch. de Psychol.*); *Pour la philosophie de la conscience* (*An. ps.* xii.)).

Binet never took up metaphysics, a study which he rather disdained, or which at any rate never arrested his attention, always directed hitherto towards facts of experience. But no one must say, "Fountain, I will not drink of thy water." One day the distinction between consciousness and matter presented itself to him and fascinated his intellect, which might have been supposed to be averse to the subtleties of epistemology. Our friend, it is true, had too much intelligence not to be able to estimate at first sight the limitations of a question, even of a question that he was attacking for the first time. He did not flatter himself that he was going to arrive at a complete and definite solution of this eternal mystery. But he hoped to simplify the data, by taking up a new standpoint. This standpoint was the one which the philosopher and physician, Mach, had adopted in his *Analyse der Empfindungen*. But Binet did not know that work. Like his Viennese predecessor, he thought that the phenomenal heterogeneity of mind and matter could be got rid of by considering the latter as a composite of sensations. From that time there was no longer an abyss to be bridged over in passing from matter to mind, and consequently parallelism became a useless hypothesis. But this point of view hardly does away with the difficulties; it merely displaces them. However great the ingenuity shown by Binet, he never succeeded in finding a point of view from which mind and body might merge into one; under one form or another their duality always cropped up anew. He himself confessed that "It is useless to shake up these two things together; they cannot be mixed any more than one can mix oil and water" (*Arch. de Psychol.*, vi. p. 25). However this may be, this attempt of Binet's is very curious, and one is filled with admiration for the tenacity with which he tried to solve this unsolvable enigma in the midst of so many other interests.

We had the pleasure of reckoning A. Binet among the collaborators

of the *Archives*, to which he contributed, in addition to the article already quoted, *Cerveau et pensée*, and two notes : one on *L'appréciation du temps* (*Arch.* ii.), the other on *Le grossissement provoqúe de l'écriture* (*Arch.* iv.).

In spite of their apparent diversity, Binet's many works form the links of one chain. The fundamental idea which originated them all is research into the signs of intelligence. It was intelligence, in reality, that Binet was probing when he studied fatigue, muscular strength, the discrimination of the points of the æsthesiometer, the variations of the capillary pulse, sanguinary pressure, the form of handwriting, the expression of the face or of the hand, the diameter of the skull, suggestibility. . . . But each time that he started on a new study, he grasped it with such mastery, that he made unsuspected problems rise out of it. Also many of the questions, which were for Binet simple stages on the road that he was travelling along, have appeared so important and so fertile in themselves that they in their turn have become centres of new research; and so it has become possible when considering the powerful branches to forget the tree from which they emanated. Thus the experiments in *suggestibility* engendered the whole of the *psychology of witness*; the study of the intellectual differences of his two daughters incidentally introduced the question of the *psychology of thought.* And this makes us at once understand why Binet did not explore exhaustively all the veins which he brought to light (more often than not it was the Germans who exploited them, as was notably the case in the psychology of witness); it was because these new questions, interesting as they might have been in themselves, were only incidental to the end which, without being apparent, Binet faithfully pursued.

If we try to pick out the principal traits of Binet's scientific personality, the characteristic which strikes us most is virtuosity; he was a virtuoso in work, a Paganini of psychology. Under his touch observations and experiments yielded all the sounds they were capable of giving. He was also profoundly original. Being too much occupied with his own work to be able to read much of the work of other people, he addressed himself to problems with a complete absence of prejudice and a freshness of vision eminently favourable to the discovery of new facts.

Another characteristic is his absolute independence of mind. Binet was not one of those who are afraid of compromising themselves. He thought rightly that the world of facts does not possess forbidden regions, and that everywhere traces of truth may be discovered, provided one is armed with method and prudence. Therefore he was not afraid to be the first to undertake the experimental control of graphology

(*Les révélations de l'écriture*, Paris, 1906), and even of chiromancy, which is in still worse repute (*Essai de chiromancie expérimentale* (*An. ps.* xiv.)).

It is also particularly characteristic of him that he followed the career of an experimental psychologist, and very brilliantly, without becoming, ever so little, a disciple of the German school. For Binet, although he read English fluently, did not know a word of German, and he knew nothing of the work beyond the Rhine except what he learnt by hearsay. In this respect his friend and pupil, Victor Henri, was at one time a valuable auxiliary. For all that, it is none the less true that, ignoring nearly all the German publications, he was able to approach psychological problems with a mind free from all those suggestions which, all unknown, often dominate and limit the thought of a great scholar.

The psychology of Binet contrasts, indeed, with the German psychology of fifteen or twenty years ago as being a psychology more athirst for concrete reality: it aims less at studying mind in general than minds in particular—individuals; it has to do more especially with the higher mental processes, with those which play a part in the realities of everyday life, without stopping short at sensations, which are for Binet's psychology only trifles on the threshold. Or if he does linger there, it is to find out how intelligence behaves with regard to them. To-day, everywhere, psychologists occupy themselves with these higher mental processes. This is due in great measure to Binet. I do not think I exaggerate when I say that he is one of those who have done most to direct contemporary psychology to questions of application, which are in the end the most important questions even for theoretical psychology, since they bring the psychologist face to face with real life, and thus oblige it to take account of the modifications that its complexity imposes on mental functions.

Neither did Binet inherit anything from French psychology. Before his time no one in France had carried out a genuine psychological experiment (I except, of course, experiments in hypnotism). To begin with, he was Charcot's pupil, but it was only within a very limited area that he worked under this master. Perhaps he was more affected by English influence. In certain ways he reminds one of Galton: his keen observation, curiosity as to individual peculiarities, the tendency to consider individuals in their natural surroundings rather than in a laboratory. . . . But Galton was more of an anthropologist and statistician than psychologist, and a comparison between the two could not long be sustained. In short, Binet appears to me to be a profoundly original personality, he is like no one but himself.

His scientific production, as we have seen, was considerable. He

had great facility for work. It was no trouble to him to write. On the contrary, it was an almost voluptuous delight to him. "One of my greatest pleasures," said he to me one day, "is to have before me a sheet of blank paper to fill up." Work cost him no effort; it was a natural function which developed as it were in play: "I work quite naturally, as a hen lays eggs," he declared.

This pleasure was found in the actual fact of giving out, of creation: a work once accomplished lost for him the greater part of its interest; and it even happened that he neglected to go to see one of his own theatrical pieces represented on the stage. Not often are authors found who are quite so free from infatuation.

Binet never did any teaching, his laboratory at the Sorbonne never being associated with any official course of study. Besides, his genius would with difficulty have accommodated itself to the sacrifice of time that courses of lessons, practical exercises, or the direction of pupils would have necessitated. His mind was too full of ideas, of plans for study and experiments to leave him the calm leisure necessary for the priesthood of teaching. He was a fine type of what Oswald would have called the "romantic" seeker, with "rapid reaction" (in opposition to the "classic" scholar, with slow reaction, the typical professor). Doubtless he could have done violence to himself, and, like so many others, preferred to the apparently more modest path of natural aptitude the glaring road leading to fortune and honour. But worldly success had no attraction whatever for Binet; in this respect he was a true sage (special sign: he was never decorated). But he was rewarded by his wisdom; for the modest pathway led him through fertile tracts, and, in view of the splendid harvest which Binet reaped, no one could regret that he did not give it up in order to run after easy but ephemeral successes. Also one would have to be very little of a psychologist and to care very little for the conquests of science to reproach Binet, as some have done, with having had no professorial ambition. Binet, moreover, never repulsed serious workers, whose collaboration he always gladly accepted: Victor Henri, Larguier, Simon, and many others, such as the numerous teachers of the *Société libre pour l'étude de l'enfant*, can bear witness. But it is true he was inexorable towards all those who he thought might be actuated by other motives than the search for truth. And as such people are rather numerous, one cannot be surprised that he should have made a few enemies.

Binet had no false self-respect. Not only did he claim no priority for himself, but, on the contrary, he went so far as to forget his own work and to congratulate an author on remarks which had been borrowed from himself. Once, however, he made a claim, but so

timidly: it was in connection with the name of "École de Wurzbourg," which was given to all the disciples of Külpe, who investigated thinking by a method of introspection carried out with intention, a method also adopted by Binet: "While giving all due credit to the excellent work which has been initiated by our excellent colleague at Wurzbourg," says he, "we make a small claim, and without insisting on purely personal reasons which make us protest against this attempt at annexation, we propose that the more equitable name of 'méthode de Paris' [Binet, *Année Psychol.*, xv., preface] shall be given to this method." In reality introspection, which Binet always considered an indispensable auxiliary to experiment, was applied to the study of thought simultaneously and independently by the psychologist of Paris and his German colleagues; but the latter have taken care to more explicitly lay down the principles of the method, so that the "École de Wurzbourg" has doubtless some good claim to advance (cf. Külpe, *Comptes rendus du Congrès de Psychologie de Genève*, 1909, p. 24).

This polemic interested Binet but little. The systematic vilification of an adversary fighting against the evidence of facts made him smile, for his sense of humour was great. Besides, he was a tender-hearted man, an affectionate and faithful friend; and with perfect modesty was combined a certain timidity and even a little shyness. Never could he be persuaded to take part in a Congress. And yet there were so many of our colleagues who would have liked for once at least to have made his personal acquaintance! For a long time he lived at Meudon in order to be quieter. In the summer he lived at Samois, near Fontainebleau; he owned a little country house there, and in recent years had allowed himself to be placed on the municipal council of the *commune*. He took very seriously his new civic duties in which he found a fresh interest; doubtless the psychology of the parish council offered new problems for his insatiable curiosity. He made use of the situation to initiate an inquiry of the highest interest, and one easier to follow up in the country than in the town, on the social effect of school: what had the children who passed through the Samois school become, how had they turned out? (cf. *Bul. Soc. ps. Enf.*, February, 1909).

Such was the man whom psychology has just lost. He leaves a gap which it will be hard to fill. The sad irony of it is that his country in which he so lavishly sowed the good seed of his fertile genius, should be one of the most refractory in the progress of experimental psychology. Further, his work even in his immediate circle was not always understood and did not receive the encouragement it deserved. Nevertheless, his name will remain among great names in the science of psychology, and the lapse of time will only make it greater.

OBSERVATIONS ON THE DEVELOPMENT OF THE COLOUR SENSE.

By Dr. O. DECROLY and Mlle. DEGARD.

Translated and abridged by T. G. Tibbey, B.A.

General Considerations.—The development of ideas of colour has already been the subject of several inquiries, and Miss Shinn has summarized some of the results as follows:—("The Development of the Senses in Childhood," University of California Publications, July, 1907.)

1. The sense of colour seems absent during the first months after birth.

2. The first signs of colour ideas appear at about six months, and the first colours noticed are those that have the greatest wave length; colours of short wave lengths are not perceived before the 18th month.

3. During the 3rd year, sometimes towards the end of the 2nd year, the child can note all the colours as well as an adult; he is also able to name them, and can point out the colour in the things around.

4. Light is a source of pleasure earlier than colour; similarly bright colours are preferred to others. At 3 years these bright colours often lose this advantage, and sometimes more subdued ones are preferred.

These conclusions, drawn from observations on her neice, and from those made by a number of other investigators, as Darwin, Preyer, Baldwin, and Mrs. Tyler, yet need to be further tested, since they are founded upon a small number of subjects, and it is important and interesting to bring new facts to support or invalidate them.

The following is a record of personal observations made upon a little girl from birth to $4\frac{1}{2}$ years:—

Long before the child is able to understand the type-experiments proposed by Preyer and Binet on colours (2 to 3 years) it is able to distinguish them. At 5 months 3 days, when this little one was crying, a red handkerchief was moved above her cradle. She smiled; soon she began to cry again; but upon the handkerchief being shaken, she again stopped and watched it, but did not smile. There was some doubt whether her attention was directed to the movement or to the bright colour. Eight days later she sent the same handkerchief, then hanging above her cradle, from one side to the other, smiling and crowing. Nine days later there was hung before her a red and a white handkerchief; she watched the red one carefully, and gave to the white but a passing glance; when shown the same red handkerchief and a piece of navy-blue stuff, it was the red which longest held her attention.

Some experiments made at 9 months with red, yellow, and green paper, and with red and yellow balls, were not conclusive, but tended to show some preference for yellow. At 12 months 15 days, four bottles were taken, exactly the same in form as her usual bottle of milk, varying only in the colour of their contents, one containing milk, the others solutions of red, yellow, and blue respectively. These being offered to her at meal time, suspended from a rod 15 cms. apart, she first showed some desire to play with them. They were taken from her and again offered, whereupon she seized the red bottle, but immediately relinquished it for the milk. When again taken from her and their places changed the selection of the milk was decided, as it was 4 and 7 days later. This showed that she recognized the milk by its white colour; but the authors are certain that had the experiment been made earlier she would have made this distinction before 12 months—which seems probable.

They next wished to see if, besides the perception of colour, she had the memory of this perception. Three boxes were made of the same form and size, opening easily, and coloured yellow, red, and green respectively. At 16 months 12 days the child was shown a piece of chocolate of which she was very fond, and, calling her attention to it, this was put into the red box. The three boxes were then thrown on the ground, where she was crawling, within her reach. The green box, the cover of which opened in falling, was before her, but she turned towards the red; then seeing the green box almost open, lifted the lid, looked in; then turned again to the red box, found and ate the chocolate, but still opened the yellow box. On the experiment being repeated in the same form she tried to take the box with the chocolate from the hands of the experimenter. When they were placed on the floor, she went directly to the red box and found and ate the chocolate, yet she still opened the other two and looked carefully in them, not having yet understood that the sweetmeat was only put into the red box. At the third and fourth experiments the next day, the chocolate still being placed in the red box, she on each occasion opened the green box first, then the red, ate the chocolate, and then opened the yellow. Evidently the results did not certainly show that the child remembered the colour of the box in which the chocolate was placed, but in the 29th month this was clear, for she only looked in that box and did not look in the others.*

When the child was 22 months 5 days old another test was given,

* The uncertainty in this result may have been caused by the fact that at first, opening and looking into the boxes was itself a matter of interest, which interest wore off later. It would have been well to have let the child play with the boxes at intervals during some days before beginning the experiment with the chocolate, to eliminate this disturbing factor.—T. G. T.

to see if she were able to compare two colours. For this two cards 25 cms. by 35 cms. were used, each divided into four, and on each quarter was drawn an outline of a man or woman, coloured respectively red, yellow, blue, and green. There were also made eight smaller cards, each one-fourth of the larger and bearing similar figures similarly coloured. The child was first shown how she was to put the smaller cards upon the space in the larger one bearing the figure like its own. At the first essay the red figures only were correctly placed; at the second, after being again shown, the yellow woman was put in its right position, but the two red figures were inverted; this seemed to show that an error had been made in introducing the second element of form, and that the figures ought all to have been of the same shape, leaving only the colours to be compared. Five days later, after some more lessons, the number of which was not noted, she could perform the task successfully; but even then she could only succeed when she was allowed to place the cards herself; when asked to show on the larger cards before her where the smaller should be placed, she failed, from lack of understanding what was asked of her.

She had from her 19th month showed some power of classification, but in her 23rd month, when an attempt was made to get her to sort out some red, yellow, green, and violet counters into similarly coloured boxes, she took little interest in the test and refused to do it; two months later, seeing her elder brother doing this, she wished to imitate him, and did so successfully.

In her 32nd month (31 months 20 days) she was able to place correctly, one above another, pictures of little girls dressed in brightly coloured clothes of different hues—for example, a red skirt, a green blouse, and a yellow sash; a yellow skirt, red blouse, and green sash, etc. This showed that she possessed the power not only of comparing colours, but also of noting their arrangement. In the 33rd month she often played with small beads, and of her own accord threaded together beads of the same colour, usually choosing blue. When one began the task for her she would continue threading them alternately, white and blue, yellow and red, etc., but she was unable to continue when two of each colour were alternately threaded; she had not yet acquired the idea of two, and it was much later before she was able to thread beads arranged in a more or less complicated order.

Thus the little maid could recognize, compare, and classify colours long before she was able to tell their names; it was not until the beginning of the 28th month that an attempt in this direction was noted. For "red" she used the word "ink," because, an inkstand with red ink being kept within her reach, and she having frequently spread

the said red ink over herself and her pinafore, the word "ink" often came into the terms of reproof, and she had attached it to the colour which attracted her rather than to the substance. During her 28th month she successfully applied this term to red substances, and about the same time made use of the word "black," but in the sense of darkness. In the middle of her 31st month she was first heard to use the word "red" correctly, this in reference to some radishes on the table; a few days later she compared a red box with her red pinafore. After this, however, for some time the word was used as a general term for all colours; at the beginning of the 34th month it was again accurately applied to red things, the word "blue" taking its place as a general term for all colours except red; "black" was still only applied to darkness.

Between the 34th and the 35th month considerable progress was made; black and blue were accurately applied, white and yellow were used, though the latter included also brown and orange, and was sometimes dropped in favour of "like an egg." During the 35th month the question, "What colour?" began to be understood. Thus by three years of age she knew the reds, blues, black, and white, and was hesitant as to yellow, and at this time began to show a great liking for making colour comparisons. For instance, a doll with black hair having been given to her, after examining it a moment, she said, "She has black hair; she is like Y—— "—a child with black hair. In a picture showing a small boy with reddish hair, she said, "There is hair like G.'s." Towards the 41st month she attached the colour to almost all the things she called attention to—"My black boots," "The white paper has fallen," etc.—and in the 42nd month she herself often asked, "What colour?" when the colour was not among those she knew. By the middle of the 47th month she was able to play a game at colour comparison, involving recognition of shades. She would examine the piece of coloured paper and place it with assurance on the identical tint, rarely making a mistake. The next month, when shown a piece of rock-crystal, she described it as being "like water," and in her 50th month she spoke of beads "like water," and "like beer," to designate those uncoloured and those of a transparent yellow. In her 52nd month she still called violet "blue," and protested when told she was wrong, but three months later had distinguished violet and found the colour of lilac very pretty. But even at this time she could not use the term "brown"; brown things were often spoken of as "like chocolate," and in her 58th month an overcoat was described as being "like the coffee that I drink."

Conclusions.—It would seem that for this little girl colour had some attraction about the sixth month, though this attraction may have

been due to the added factors of brightness and movement that were present.

The experiment with the bottles showed that during the second half of the first year the child had clearly become able to distinguish white among other colours.

The ability at 19 months to find the chocolate in the box in which it had been placed showed that the discrimination and memory of colour had already reached an advanced degree of development. This discrimination was shown more clearly in the 23rd month.

It was not until the 28th month that the first colour-name was used (ink); it may be noted that the term "red" served for a time for any colour and was first used exactly between the 34th and 36th month. At three years the question "What colour?" was understood; later she associated objects and colours (37 months), and afterwards began herself to ask, "What colour?" when the colour attribute became for her an important quality of objects (42nd month). Nevertheless, though brought up in an environment where, without particularly insisting upon the verbal side of observation, there was frequent opportunity of hearing terms relating to colour, this child, who appeared quite normal, did not show that knowledge of the complete terminology of colours at three years which Miss Shinn believes to be generally possible. Certainly in the development of the vocabulary it is not possible to eliminate the influence of the environment, which ought to have a marked effect upon subjects who have been through the special training involved in a study of the early development of colour ideas, otherwise we should not be able to understand how Warburg (*Münchener Medic. Wochenschr.*, 1909, p. 251), after an inquiry upon 1800 school children, could state that children of five years did not know all the fundamental colours, and that of those from six to seven years, 43 per cent. only knew completely the series white, black, red, yellow, green, and blue, and none knew brown, grey, and violet—just as one would not understand how MM. Binet and Simon (*Année psycholog.*, xiv., 1908, p. 3) could have placed among their tests for eight years that of naming the four colours red, yellow, blue, and green.

Note.—The above is from *L'Ecole Nationale* (Belgium), December 1, 1911. A copy of this is in the library, and members are referred to it for further details of the experiments.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Mental Heredity.—"We must discriminate between those properties of mind which we may loosely term its capacities, and those which we may term its contents. The contents of mind, its memories and its habits, its thoughts and its ideals, these are not inherited; they are without doubt acquired during the lifetime of the individual. But the capacity to acquire, and the inclination towards certain acquisitions, these may be present from the beginning. Were no other mental characteristic hereditary, educability, *ex hypothesi*, is. Consequently differences in educability may be hereditary too. While gross or absolute achievements are obviously affected by gross environmental differences, within the same environment the relative achievements may differ in a way which allows of no other explanation than inheritance. . . . [Observations show] the principles which such inheritance obeys. In the case of the individual, we found the influence of heredity large and indisputable; in the case of the race small and controverted."—*Cyril Burt, M.A.*, on "The Inheritance of Mental Characteristics," *Eugenics Review*, July, 1912.

The Importance of Sleep.—"In accordance with the laws of our nature whereby activity must be followed by a period for recuperation, each organ has allotted to it a definite cycle of work and rest. . . . Sleep is essential both for the needs of the nervous system and also for the regeneration of the organism as a whole; it has been shown that an animal will survive three weeks of starvation, but that complete deprivation of sleep for but five days will lead to death. . . . Children of school age are by no means always good sleepers, and inability to sleep is especially apt to occur as a result of overwork. Homework continued up to late hours is a fruitful source of sleeplessness, and this is especially the case where arithmetic and similar subjects are set. . . . The *immediate results* ['of insufficient sleep'] are a general loss of mental and bodily vigour which is often preceded by a period of abnormal mental clearness and activity. This soon, however, wanes, and the victim experiences a general langour and want of interest in his surroundings, a dislike to exertion, whether mental or bodily, loss of power and concentration, and a change of character to the side of irritability and mental depression. This mental deterioration not uncommonly gives rise to complaints on the part of masters; the boy is said to be lazy, is blamed for sleepiness in class, and may even receive punishments for his lack of attention. . . . On the physical side there may appear loss of appetite or dyspepsia, constipation, and loss of weight, and the patient

presents an appearance of lassitude with dark rims round lack-lustre eyes, and pallor and sallowness of visage."—*Dr. Clive Riviere*, on "Sleep," *School Hygiene*, May, 1912.

Physiological Education.—Madame Montessori says that her method is based on Séguin's *Physiological Method*. This is how Séguin describes it:—"According to this method education is the *ensemble* of the means of developing harmoniously and efficiently the moral, intellectual, and physical capacities, as functions, in man and mankind. The method consists in the adaptation of the principles of physiology, through physiological means and instruments, to the development of the dynamic, perceptive, reflective, and spontaneous functions of youth. The general training embraces the muscular, imitative, nervous, and reflective functions. All that pertains to movement, as locomotion, and special motions; prehension, manipulation, and palpation—by dint of strength or exquisite delicacy; imitation and communication from mind to mind, through languages, signs, and symbols. The senses are trained, not only each one to be perfect in itself, but so that if any one be lost, another may feel and perceive for it. Whatever development be given to the sensorial faculties, the reflective and spontaneous must receive a corresponding culture, and *vice versâ*."

NOTES.

Lecture Lists of the Societies.—BIRMINGHAM: *Children and Cinematographs*, H. Holman, M.A., November 19; *Children in Books*, Miss R. Sidgwick, M.A., December 10; *Presidential Address*, Dr. W. Jordan, January 21; address by W. A. Brockington, M.A., February 18; address by Rev. G. M. Moore, March 18. Meetings at the University at 6 p.m.

CHELTENHAM: Annual meeting, October 16; *Greek and Roman Child-Study*, Dr. R. Cunningham Affleck, November 14; Discussion, February; *Pre-preparatory Training*, Mr. Auden, March 13.

DUNDEE: *The Montessori Method*, Dr. R. R. Rusk, November; *The General Instinctive Tendencies of the Child*, James Drever, M.A., B.Sc., December; *The Development of the Social Consciousness in the Child*, John Sime, M.A.

HALIFAX: *Handwork in Education*, Dr. C. Reddie, October 2; address by Dora Walford, B.Sc., October 16; *What is and What might be*, H. H. Quilter, M.A., H.M.I., November 13; *The Backfisch*, Miss Bone, November 27; *The Montessori Method* (with apparatus), December 11; address by Dr. Williams, January 22; address by Prof. Green, M.A., February 5; *The Child—an Individual*, Miss Reynolds, February 19; *The Inheritance of the Child*, Dr. P. Sandiford, March 5; *The Boy Scout*, Rev. P. Gough, March 19.

LONDON: *Psychological Development and the School Subjects*, Dr. T. Percy Nunn, October 17; *Statistical Theory for Teacher and Administrator*, Dr. F. H. Hayward, October 31; *Maria Montessori's Method and Self-Education*, Madame Pujol (of Paris),

November 15; *Conference on the Montessori Method*, November 16; *The Outlook of the Adolescent towards Livelihood*, discussion, opened by Mrs. M. O'Brien Harris, D.Sc., and A. H. Paterson, November 28; *The Psychology of Music*, Dr. C. S. Myers, December 12.

MANCHESTER: *Printing in Colour from Wood Blocks*, Allen W. Seaby, October 11; Inaugural Meeting of Associated Educational Societies, November 6; *School Needlecraft*, Miss M. Swanson, December 6; *New and Old in Dr. Montessori's Method*, Miss C. Herford, January 24; *Punishments*, discussion, opened by Prof. Findlay, February 21; *Handwork*, discussion, opened by Miss Wroe, speakers—J. H. Judd, Miss L. Start, J. Shelley, March 21.

TUNBRIDGE WELLS: Lectures arranged on (1) *Age at which different Faculties Develop;* (2) *Physical Education;* (3) *Religious Instincts*, and the lines on which they should be developed; (4) *Imagination and Day-dreaming.*

Information Wanted.—An inquiring member is anxious to know: (1) Of any reports or articles on the question of the suitability of large orphan schools for young (fatherless) children, and comparison with maintenance at home with the (widowed) mother. (2) If any society has investigated the matter, or outlined any policy in regard to it. (3) Of any society (in England) which attempts supervision in regard to *child welfare generally.* If any reader can help, will he or she please reply to the Editor?

A Conference on the Care of Babies and Young Children was held in London in March last and was attended by Mrs. Richards and Miss Jobson as delegates for the London Child-Study Society. Addresses were given by Miss Margaret McMillan on *Nurture versus Education*, by Mrs. Pember Reeves on *Provision for Maternity*, Dr. Ethel Bentham on *The Work of the Baby Clinic*, and by Mrs. Despard on *Training for Parenthood.* The London Society's delegates sent full and interesting reports to the Council, and we regret we are unable to print extracts from them.

REVIEWS.

An Introduction to the Study of Adolescent Education. By CYRIL BRUYN ANDREWS. Rebman. Pp. x., 185. 5*s.* net.

There are many useful and suggestive remarks in this somewhat discursive book—which may prove helpful as an introduction to a more serious study of the subject. It would appear to be meant for teachers in secondary schools who have little knowledge of boy nature or of scientific methods of teaching. The following topics are discussed: the science of education—modern views and ancient dogmas; adult influence on adolescence; immorality and sexual perversion in schools; the cures of immorality and sexual pathology in schools; self-assertion and discipline, and its psychological and physiological aspects; future ideals.

Essays on Duty and Discipline, Vol. IV. By various authors. Cassell. Pp. 136.

This is a little book issued by the "Duty and Discipline Movement," and published "with a view to counteract the lack of adequate moral training and discipline, the effects of which are so apparent in these days amongst many British children, in rich as well as in poor homes." If the reviewer's ideas of education are sound, this volume is full of educational fallacies. Those who can separate the much chaff from the little wheat in it will waste their time in reading the book. One is sorry for other readers.

Our Children's Health at Home and at School. Edited by CHARLES E. HECHT, M.A. National Food Reform Association. Pp. 467. 5*s.* net.

This is the Report of a Conference on Diet and Hygiene in Public Secondary and Private Schools, held at the Guildhall, London, May 13, 1912. It includes the following papers, and discussions on them : "Diet as a Factor in Physical, Intellectual, and Moral Efficiency," by Dr. Clement Dukes; "Existing Methods and the Main Lines of Reform in Diet in Boarding Schools," by Miss M. E. Robertson ; "Diet in Preparatory Schools," by W. H. Prosser, B.A. ; "The Importance of Adequate Meals and Suitable Dietary in securing Efficiency and Good Scholarship," by Dr. Alfred A. Mumford ; "Main Lines of Reform at Public Secondary and Private Schools," by Dr. J. Sim Wallace ; "Instruction in the Elements of Physiology and Personal Hygiene," by Dr. C. E. Shelley ; "The Teaching of Health (Personal and Social)," by Dr. Cecil Reddie ; "Problems in Institutional Feeding," by Mrs. Stanley Hazell ; "Training in Institutional Work," by Miss Marie Michaelis, M.A. There are also nearly fifty pages of specimen menus.

Those who have to do with children's diet, whether in schools or homes, will find much very valuable help and guidance in this volume. Mothers, matrons, and heads of boarding schools should get it, study it, and apply its teachings.

Introduction to Experimental Education. By ROBERT R. RUSK, M.A., Ph.D. Longmans. Pp. viii., 303. 4*s.* 6*d.* net.

"This work seeks to make accessible in convenient form for English readers the main results of the new investigations in the new subject of Experimental Education. It is based on E. Meumann's 'Vorlesungen zur Einführung in die Experimentelle Pädagogik.'" It discusses the methods of experimental education and gives a critical survey of the results of researches on physical and mental development, attention, sense-perception, apperception, memory, association and imagination, æsthetic and ethical development, individual differences, the doctrine of endowment, mental work of the child, mental hygiene, psychology of reading, writing, and arithmetic.

This should prove a most helpful book to all interested in the subject, as it brings together matter which has been very scattered hitherto, and serves both as handbook and bibliography. It is just the book that is wanted at the present moment, and is very ably compiled. Used with Dr. Claperède's *Experimental Pedagogy* it will give an admirable introduction to scientific Child-Study. One regrets that researches on motor development, and its relation to physical education (educational handwork, etc.), have not been dealt with at length.

L'Education Familiale. March, April, June, 1912. 44, Rue Rubens, Bruxelles. 6 fr. per an.

This publication often contains some useful articles, and those having children to care for might well consult it. As before noted, for it the mother is the centre of the universe ; to correct this, in the March issue the father receives some good advice, which, if brief, is at least all-embracing. Notable articles deal with *Abnormal Childhood ;* and *Physical Exercises*, in the March number ; *Advice to Parents on Training Children*, in April and June ; and *Notes on Children*, in June, which contains some useful advice on the value of observation.

Archives de Psychologie. February and March, 1912. Williams & Norgate. 3 fr. 25 and 4 fr. 25. **La Revue Psychologique.** December, 1911, March, 1912. Misch & Thron, Brussels. 2 fr. 50. **L'Educateur Moderne.** May, June, July, 1912. Paulin & Co., Paris. 1 fr. 25.

The article by Dr. Decroly and Mlle. Degard, on the *Evolution of Ideas of Continuous and Discontinuous Quantities among Children*, which is the leading article in the May issue of the *Archives de Psychologie*, is worthy of an exhaustive notice, which we are unable to give. This same number contains also the third of a series of studies upon the *Sleep of a Little Child*, by M. Cramaussel, the first two of which

have already been noted in our columns ; in this, the longest of the three, the author sums up his conclusions. For those interested in experimental psychology, a description of a new tachistoscope in the February issue should be of interest ; whilst the student of children should read a short article by M. Luquet on *The First Period of Drawing*. Perhaps, however, the most significant of all to the general educationist is an article by the editor, Dr. Claparède in this number, descriptive of *An Institute of the Educational Sciences*, and the needs which it will supply, in which he sketches the programme and justifies the founding of the new "Institut de J. J. Rousseau," which is to open at Geneva this session for the study of the more scientific aspects of pedagogy.

La Revue Psychologique is largely dependent upon its editor, Mlle. Dr. Ioteyko —and one wonders how she manages to get through such a vast amount of good work—with the assistance of Mlle. Kipiani. Together they contribute two articles to the December number on *The Rôle of the Muscular Sense and of Vision in Writing*, and *The Rôle of the Muscular Sense in Drawing*, while each contributes a separate shorter article. The issue for March, 1912, consists of some of the papers read last year at the First International Congress on Paidology, this selection being mainly devoted to the question of the teaching of Pedagogy, and the need for a unification of terms.

L'Educateur Moderne is closely allied to school work, much of which is, however, mainly concerned with French conditions. The May issue is particularly good ; the editor, Gabriel Compayré, contributes an interesting review of *New Schools*, giving Bedales as an English example ; a later article deals with *Poetry at the Elementary School* ; whilst there is also an interesting account of a "*Bush*" *School in Australia*. To the three numbers, Dr. Pauchet contributes articles dealing with *Self-education*, giving the views of a medical man strongly impressed by the value of suggestion and self-control, and interested in Eastern philosophy ; whilst June and July provide some interesting history of education in Northern Italy during the French occupation.

Publications Received.—*Bibliographie Pédologique Polonaise*, edited by Mlle. Aniela Szyc ; *American School Peace League*, Third Annual Report ; *The Life and Teaching of Jesus*, daily Gospel readings for young children, by Edith E. Read Mumford, M.A., pp. x., 160, Longmans, 1*s*. 6*d*. net ; *National Association for the Feeble-Minded*, 16th Annual Report ; *School Hygiene ; Eugenics Review ; Child Life ; Parent's Review ; The Journal of Education ; Educational Times ; The Woman Teacher* (weekly), and *The Woman Teacher's Magazine* (monthly) ; *Peace Day*, suggestions and material for its observance in schools, by Fannie Fern Andrews ; *Metropolitan Asylums Board*, 14th Annual Report of the Children's Committee ; *Agyermek* (*The Child :* the organ of the Hungarian Child-Study Society) ; *L'Education Familiale* ; *The Nature and Consequences of Deafness*, and *On the Classification of Deafness, and prevention of acquired Deafness*, two lectures by Dr. J. Kerr Love, issued by the National Bureau for Promoting the General Welfare of the Deaf ; *Love's Victories*, the Happy Publishing Company—"written, printed, and published by women," pp. xii., 143, 1*s*. net ; *Milton's Minor Poems*, introduction and notes by Rev. Edmund Dale, M.A., D.Lit., J. M. Dent & Sons, pp. 119, 1*s*. net ; *Old Rhymes with New Tunes*, by Richard Runciman Terry, illustrated by Gabriel Pippet, Longmans, pp. 32, 2*s*. 6*d*. net.

Vol. 5.—No. 4. JANUARY, 1913.

Child-Study.

The Journal of the Child-Study Society.

MEASUREMENT IN CHILD STUDY.

By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

(*Continued from page* 78.)

There is one group of atypical children specially deserving of attention, that in which there is loss of moral control without appreciable intellectual defect. There are children—no medical man versed in mental disease will doubt it—in whom a diminution or defect of moral control is a symptom of a morbid mental state, apart from any such general disorder of the intellect as is ordinarily recognizable. Let me quote in an abbreviated form just one such case reported by Dr. Still, who, in his Gulstonian lectures, has ably and convincingly dealt with this atypical condition.

"A boy," he says, "nine and a half years, has been under my care for twelve months. Up till the age of seven he was a very obedient and well-behaved child. He had learnt to walk at eighteen months, and talked well at two years. He had convulsions when ten months old, but otherwise was thought to be a perfectly healthy child until the onset of the present condition. Just after the age of seven he altered altogether, and became extremely disobedient, taking little or no notice of commands. He was very self-willed, and tore his clothes to pieces when he did not like them. He showed unnatural cruelty—was found one day cutting up a living rabbit with scissors, and was, as his mother said, smothered in blood. At another time he was found beating chickens with a stick. He was expelled from the Sunday school because outrageously unruly and quarrelsome, and at a day school he was a continual trouble. He pilfered small articles and stole half a crown from his mother. On being taxed with his misdemeanours, he flatly denied them or invented plausible tales to account for them. He became filthy in his habits. Although extremely frightened by corporal

punishment, he would immediately after it commit the same offence for which it was inflicted. His maternal grandfather committed suicide, his paternal grandfather is insane, and a grand-uncle died in a lunatic asylum. He is," says Dr. Still, "a bright, attractive little fellow with a pleasing face, and no stigmata of degeneration, and his conversation is bright and intelligent, but he shows that lack of attention that is noticeable in so many of these cases."

In cases of this description, and they are numerous, it has been said that there is no appreciable or recognizable defect of intellect, but the lack of attention to which Dr. Still refers as common, suggests some involvement of intellect, not demonstrable by our present methods of investigation. In such cases, and indeed in all cases of mental defect, it has been felt that trustworthy tests of intelligence are a great desideratum. The usual course, in examining the feeble-minded, is to try them with reading and writing and simple sums in arithmetic, and to question them about current events and familiar objects, and in all pronounced cases that, taken in connection with physical stigmata, is sufficient to enable a judgment to be formed, and a place in classification to be assigned.

But it is in the slighter cases of mental defect that the want of a trustworthy standard has been felt, and indeed the want of such a standard is felt, apart from any measurement of positive defect, for the classification of school children generally. The ludicrous differences in the returns made by teachers, asked to sort their children into five groups: (1) brilliant; (2) above the average; (3) average; (4) below the average; (5) dull (the brilliant varied from 1 to 83 per cent.), make it abundantly clear that some new gauge is needed. Hence it is that a number of systems of precise mental tests more or less ingenious have been proposed. An admirable paper on the "Experimental Study of General Intelligence" was contributed to the Journal of the Child Study Society last year by Mr. Cyril Burt, who recommends reasoning tests by which all-round innate mental efficiency may be measured. But his tests are only applicable in the higher and more complex levels of mental activity, and cannot take the place of Alphabet or Spot, or Pattern or Dealing or Tapping tests. The test systems invented by Sante-de-Sanctis, by Binet and Simon, by Abelson have each their advantages, but I wish particularly to direct your attention to Kraepelin's Reckoning test as modified by Maloney, which seems to me to afford a good index to working intellectual capacity in the child.

Some time ago I communicated to the Royal Society of Edinburgh a paper on "A Method of Measuring Mental Processes in Normal and Insane People, with special reference to Maniac Depressive Insanity,"

by Dr. G. R. Jeffrey of the Crichton Royal Institution. I was, on reading that paper, so much struck by the results obtained by Dr. Jeffrey, who adopted the Kraepelin-Maloney method, and especially by the way in which the mental state of the patient was reflected in the work-curve, that I consulted him as to the employment of the test in measuring the intellectual capacity of children. The Reckoning Test, because of its simplicity, seemed applicable to all grades of mind, normal and abnormal, and as Dr. Jeffrey agreed with me, he kindly undertook a preliminary trial. The preliminary trial has involved him in a great amount of labour, but it has been carried out with the utmost skill and patience, and has yielded highly interesting results. These results will be embodied in a paper which Dr. Jeffrey will read before one of our learned societies, but in the meantime I am permitted to quote from the very able Report he has compiled and forwarded to me.

The Maloney-Kraepelin test consists, as I dare say some of you know, of ten columns of figures arranged vertically from the top to the bottom of the page, each column containing twenty-one units, and it is conducted as follows: The person to be tested is required to add up the digits in pairs as rapidly as possible. After a few seconds warning the test begins and the time is noted. At the end of each minute, the examiner calls "stroke," and thus the number of units counted in any particular minute is known.

Dr. Jeffrey's observations were made with the cordial assent of Mr. Carmont, the Chairman of the School Board, and with the zealous co-operation of Mr. Hendrie, the Head Master in St. Michael's School, Dumfries. Eighteen children, nine boys and nine girls of eleven years of age, were selected for examination, and divided into three groups—those of bright intellect, those of average intellect, and those of dull intellect, each group consisting of three boys and three girls. The children were tested for fifteen minutes each, at the same hour on five consecutive days and under the same uniform conditions of quietness and surroundings. Even with children of eleven years, Dr. Jeffrey found no difficulty in performing the test. At that age they could all count, and as the maximum of any two units never exceeded eighteen, the addition was of the simplest kind.

Dr. Jeffrey was much impressed with the different way in which the children began the test. All of them were keen, all showed a spirit of rivalry, but for the first day, at least, the attention of the girls was much more sensitive than that of the boys, and throughout that day they exhibited a distinct restlessness, which in the boys was quite inconspicuous.

As regards the rate of working, it was found that the bright boys

were very much better than the bright girls, the average boys not as good as the average girls, and the dull boys slightly better than the dull girls. These facts are, Dr. Jeffrey thinks, in accordance with everyday experience. A bright boy is smarter than a bright girl; but an average boy is not as alert as an average girl, while there is little difference between a dull boy and a dull girl. The total rate for all the boys was 19,717—for the girls it was 18,304; hence the boys worked more quickly than the girls, exceeding their total by 1413. That the rate is capable of improvement quite independent of intellectual capacity is apparent, for all the children, without exception, showed a marked increase in the rate on the fifth day as compared with the first.

Improvability was estimated by calculating the percentage difference in the work done between any two definite days. Between the first and the second day of the test this averaged in the bright boys, 49·1 per cent., in the average boys, 28·2 per cent., in the dull boys, 25·7 per cent. The boys of bright intellect showed that they had very soon—on the first day practically—grasped the test, and on submitting to the test on the second day they showed great improvement. At the end of the test all the boys showed that they were capable of great improvement, but as was to be expected, those of bright intellect reacted best. Between the fourth and fifth days, the improvement was very slight as compared with that between the first and second and between the first and fourth days. In other words, the maximum working capacity had been nearly attained on the fourth day, leaving very little room for improvement on the fifth day. Thus in the bright boys it averaged 2·4 per cent., in the average boys, 2·3 per cent., in the dull boys, 4·9 per cent. Hence, a fact is at once apparent, viz. that the dull boys, inasmuch as they showed more improvement at the end of the test than the others, are slower in working, slower in attaining or demonstrating their best.

Improvability in the girls differed in many ways from that in the boys. Thus between the first and second day in the bright girls, it was not so great, 32·7 per cent. (instead of 49·1 in the boys, a decrease of 16·4 per cent.). Hence bright girls are possibly not as good as bright boys. The improvement in the average girls between the first and second days, 32·3 per cent., was practically the same as in the bright girls, and exceeded that of the average boys by 4·1 per cent. The average girl is therefore slightly quicker than the average boy. In the dull girls the improvement between the first and second day was larger, it reached 44·6 per cent. and exceeded that of the dull boys by 18·9 per cent.—a further fact showing more improvement than dull boys.

It may be concluded generally that bright boys are really better than bright girls, and that average and dull girls are better than average and dull boys.

As regards errors, the total number in all the boys was 126, in the girls 134, and as the boys' rate of working was larger, 19·717 compared with 18·304, the accuracy of the boys is greater. The bright boys throughout the whole test had 21 errors, the bright girls 78; the average boys had 25, the average girls 10; the dull boys had 80, the dull girls 46. Hence, bright boys, besides being quicker workers, are more accurate, but girls of average and dull intellect seem to be more accurate than boys of the same level.

The nature of the errors, says Dr. Jeffrey, was interesting, and generally it was found that in those children who had several errors, these were of a definite and recurring nature, thus, for example, 9 and 7 were persistently called 15, instead of 16; 3 and 8, 12, instead of 11. By detecting these individual flaws in a child's counting power the test is of the highest value, for by corrections and practice these mistakes may be rectified and apparently false associations be broken down.

It is a distinguishing merit of the reckoning test in the case of children, that not only does it enable a correct estimate to be formed of their intellectual powers, and thus facilitate their classification for educational purposes, but it is itself education. The time expended on it is not thrown away. It is as good as a week's teaching in arithmetic. It improves the children's power of counting, and makes them obviously more alert: it increases their accuracy, no matter what their native intellectual capacity may be; it reveals the various arithmetical faults, natural or acquired, in their mental mechanism, and affords an opportunity of correcting these and breaking down aberrant associations; and it offers the means of demonstrating intellectual incapacity in many exceptional and atypical children in whom it is not superficially recognizable.

I have led you, I fear, into some intricate labyrinths of child-study this evening, and have proved but a purblind guide; but the maze of to-day in matters scientific may become the familiar highway of to-morrow, and I entertain the confident hope that we shall before long have a great clearing up in cerebral physiology, and a great advance in our educational methods, and in the rearing of children. This Society is doing its utmost to improve the situation, and the papers to be read at this Conference, and the discussions founded on them, will assuredly promote the objects it has at heart.

THE EXPERIMENTAL STUDY OF MEMORY.

By BEATRICE EDGELL, M.A., Ph.D.

(*Continued from page* 89.)

(C) *Nature of Association.*—Most important in learning is the form of connection established between the facts which is intended shall hereafter suggest one another. The superiority of the G method lies largely in the better conditions of association which it involves. In working with nonsense syllables, the only form of association which can be relied on is that of sequence. Since the time of Aristotle togetherness or immediate sequence has been put forward as a law of association, the Law of Contiguity.

Ebbinghaus' work with nonsense syllables proved the value of sequence as a condition of association by demonstrating that the more the original succession of syllables is departed from, the harder the task of relearning a series becomes. For instance, if from original series of 15 nonsense syllables new series are built by skipping 1 syllable, 2 syllables, 3 syllables, 7 syllables, the time of relearning such series steadily increases.

Original series . . .	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Skipping 3 syllables .	1	5	9	13	2	6	10	14	3	7	11	15	4	8	12

Modern psychologists, however, recognize that immediate sequence in time or togetherness in place is far from being the only, or even the most important, condition for establishing a connection between items of experience.

Professor Stout has supplied us with a useful conception of the conditions of association by his doctrine of conative unity. When we consider any section of our life, we realize that experiences which relate to the same purpose or aim, or involve the same interest, are interrelated one with another, whatever may be their temporal relationships. Our professional life and our home life may break across one another from the point of view of time, but each hangs together as a whole, and any portion of either is what it is in virtue of its relation to the whole. Such wholes are "conative" unities, syntheses of experience round a common endeavour. So on a smaller scale our ideas organize themselves into systematic wholes in virtue of some central thread. In attending to this, that, and the other, there has been a certain point

of view or interest, and thereby this, that, and the other form an organic whole, any one member of which can suggest another. Temporal sequence is just one form of such connection. I tried to devise experiments which should test whether togetherness, juxtaposition in space and time, was as strong a basis of connection as some very artificial connection due to a special point of view, or again as juxtaposition plus generic likeness. By the kind permission of the London County Council I was allowed to try these experiments with children in some of their schools. I used cards (9 × 6 inches) on each of which there was *either* a coloured picture of some common object together with a number, *or* two geometrical figures drawn with bold outlines in black ink, *e.g.* a circle and a square.

When trying to rely on juxtaposition I showed a series of five cards with an object and number on them, asking the children to look at the cards, and take in the object and number "side by side." Five seconds were allowed for looking at each card. At the end of the series, other cards were shown bearing the numbers on the original cards, and the children were asked to write down the object which they had previously seen with that number. The order followed in the test was not the order in which the numbers had originally appeared. For artificial association the same procedure was gone through, with this difference, that the children were asked to invent (each, of course, silently for him or herself) some connection between the object and the number while they looked at the card. Practice was given in this before any test was taken, and very ingenious were the connections invented, *e.g.* a picture of an ultra rosy apple and the number 85 called forth the artificial connection, "apple, ate five." An egg of greenish-yellow hue and the number 71 prompted the connection, "7 to 1 it is bad."

For juxtaposition and generic likeness the procedure was the same as in juxtaposition, the cards bearing geometrical figures being substituted for those with objects. In the test, cards bearing one figure were shown, and the children were asked to draw the figure which had accompanied it. The results of these experiments will be seen in the following table :—

TABLE VII.—AVERAGE NUMBER OF RIGHT ASSOCIATIONS OUT OF FIVE. BOYS AND GIRLS.

	Juxtaposition. (Diverse.)	Artificial Association.	Juxtaposition. (Akin.)
No.			
Boys (171)	1·56	1·55	1·64
Girls (229)	1·62	1·69	1·90
	Age 8–10.		
Boys (246)	2·18	2·45	2·49
Girls (198)	2·59	3·03	2·40
	Age 10–12.		
Boys (145)	2·87	3·49	3·02
Girls (223)	2·36	2·91	2·55
	Age 12.		

One feature to be noticed is the general increase in number of right answers with age. This is a feature which nearly all experimental work confirms. Here the boys over twelve show much greater improvement than the girls. For the younger children, juxtaposition and kinship seem to be more favourable than artificial connection. With the older children, artificial association gives the best result.

In every case bare juxtaposition gives the poorest result. The same experiments were tried with some adult subjects, the only difference being that in their case a series of tests were taken through several weeks.

The superiority of juxtaposition and kinship and artificial association is more marked in their case than in the case of children. The educational moral is easy to draw.

TABLE VIII.—AVERAGE NUMBER OF RIGHT ASSOCIATIONS OUT OF FIVE. ADULTS.

Subject.	Juxtaposition. (Diverse.)	Artificial Association.	Juxtaposition. (Akin.)
S.	1·3	3·9	4·4
H.	2·2	4·3	2·8
St.	0·55	3·3	2·5
C.	2·1	2·6	3·6
M.	3·3	4·1	4·5
R.	2·8	4·3	4·0

II. INDIVIDUAL DIFFERENCES.—Another subject on which experimental research has thrown light is the question of individual differences.

(A) *Speed of Learning.*—In regard to their learning capacity, individuals can be divided into "quick" learners and "slow" learners. The quick learner is one who can readily adapt his attention to what is required—usually he is one who can adjust himself bodily as well as mentally to a new task. He is "on spot" at once. The slow learner, on the other hand, takes time in bringing his attention to bear on the task before him, he adjusts himself slowly to the nature of the work. With this slowness in adaptation there is, however, in most cases a greater depth of concentration. Once adapted to the task the slow learner is more absorbed thereby than the quick learner. Indeed, it would appear to be this very intensity of concentration which makes it difficult for him to turn readily to a new task.

In common thought we usually connect rapidity in learning with ease in forgetting. "Lightly come, lightly go." With many subjects this appears to be the case. When tested by the Saving Method the quick learner shows little saving in comparison with the slow learner. The Saving Method was the method used by Ebbinghaus in his work. The matter to be learnt is repeated until it can just be said by heart, then twenty-four hours later, or at any given interval, the memory for this matter is tested by seeing how many repetitions are now necessary to enable the subject to just say it by heart. The difference between this number of repetitions and the original number is the *saving* effected by the retention of the previous experience.

The following tables will illustrate the comparative saving of the quick and slow learner.

TABLE IX.—SERIES OF SYLLABLES LEARNT AT THREE DIFFERENT RATES (SUBJECTS A, B, C).*

	Repetitions.				Time in seconds.		
	To learn.	To relearn.	Saving.		To learn.	To relearn.	Saving.
I. A	12·0	4·3	7·7	I. A	190·2	68·15	122·05
B	8·3	8·3	—	B	131·55	131·55	—
C	7·0	4·66	2·3	C	110·95	73·9	37·05
II. A	18·6	8·3	10·3	II. A	207·4	92·54	114·75
B	9·0	9·0	—	B	100·35	100·35	—
C	9·0	7·66	1·34	C	100·35	85·45	14·9
III. A	25·3	10·0	15·3	III. A	225·17	89·0	136·17
B	11·3	11·0	0·3	B	100·57	97·9	2·67
C	11·3	6·6	4·7	C	100·57	58·74	41·83

I. Speed, 15·85 secs. II. Speed, 11·15 secs. III. Speed, 8·9 secs.

* Ogden, "Untersuchungen über den Einfluss der Geschwindigkeit des lauten Lesens auf das Lernen," *Archiv. f. d. Ges. Psychol.*, B. ii., 1903, p. 126.

TABLE X.—TOTAL OUTPUT IN TERMS OF TIME FOR THE THREE SUBJECTS A, B, C.

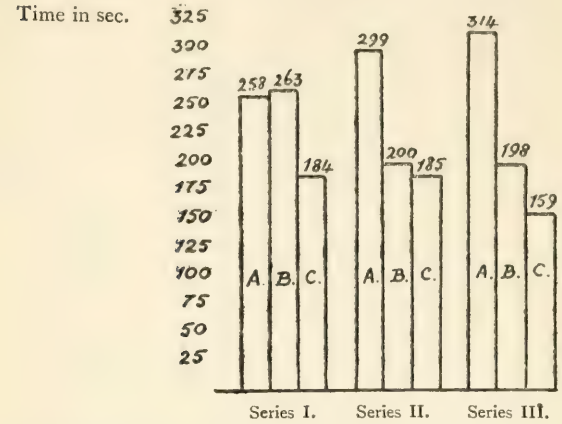
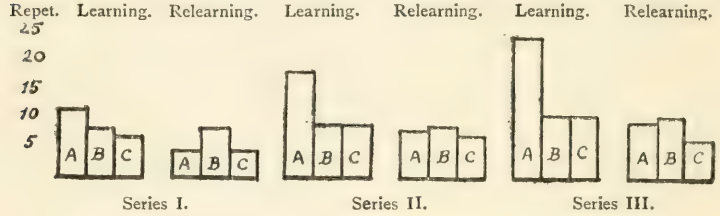


TABLE XI.—COMPARATIVE SAVING OF A, B, AND C AT THE THREE SPEEDS. GIVEN IN TERMS OF REPETITION.



The tables show that A needed longer time and a greater number of repetitions as the rate of learning was quickened. B and C, on the other hand, need less time as the rate increases. The number of repetitions required is very little more than with slow rate. When we look at the total output of work during the three series, we see how much greater is the time A spends in learning and relearning than that spent by B or C. The difference shows most clearly in Series III. where the rate is quickest. If, on the other hand, we consider what is *saved*, *i.e.* the retention effect, A exhibits far greater retention than B or C.

(B) *Imagery.*—The quick and slow learner usually differ in the type of imagery which they use in learning by heart.

The three main varieties of imagery are visual, auditory, and motor. Very few persons rely on one type solely; the majority use all varieties. Many, however, have a marked preference for one variety over another or are markedly defective in one direction.

In the case of words in which most of our learning is done, the visualist will see the words as printed or written, very probably he will also localize them with reference to context. He knows where on a page a certain fact is to be found, even if he does not remember the fact. The audile, on the other hand, hears the words, while the motile articulates them. It has been found that the use of auditory or motor is more favourable to rapid rate of learning than the use of visual imagery. I know this from personal experience. In a series of experiments I was required to learn to the beat of a metronome series of nonsense syllables. At a slow rate I could learn easily, but as the rate increased I found it more and more difficult. I depended upon visual imagery, and at the rapid rate I had no time to fix the syllables by sight, the hurried reading helped me less and less. My partner relied on sound, and whereas he was long in learning at the slow rates, he improved as the speed increased; the series yielded him a rhythm more easily and he learnt the syllables as a sound complex. Difference in imagery is important and is significant quite apart from its influences on rate of learning.

The following extracts from introspective records will show characteristic differences in the imagery suggested on reading certain words. The words were exhibited to the subjects who were instructed to perform a simple movement as soon as they had grasped the meaning of the word. They then wrote out how this meaning occurred to them.

TABLE XII.—SUBJECT ST.

Cuff.—Sound. Muscular image of movement of arm in giving a cuff. Feeling that I had lately come across the word in this connection. Then visual image of white cuff, very vague.

Damp.—Sound. Recalled corner of garden at home called "damp corner," not visual image of it, but rather my own position in the garden, knowing it was near me in a certain position.

Blind.—Sound. Image of my own eyes, positional. "Milton" sound of the word, recalled a technical on the subject.

Parcel.—Sound. Visual image of brown paper parcel. Shape very vague. Image of movements in carrying parcel.

TABLE XIII.—SUBJECT S.

Guard.—Word articulated, sounding of "g" in throat very marked, a momentary image of man in blue serge, very blurred.

Gate.—Word articulated, visual image of gate, them motor image, "I'm sitting on the stile, Mary."

Test.—Word articulated. Words articulated, "Test your results."

Music.—Word articulated. Words, "Music hath charms," articulated.

Board.—Word articulated. Words, "Board of directors" articulated.

Curve.—Word articulated. Visual image and word "Parabola."

TABLE XIV.—SUBJECT H.

Young.—Feeling of word being spoken and sound; thought, "Child."

Meat.—Feeling of word being spoken and sound; thought, "You know what it is, beef, mutton, etc."

Handle.—Sound of word and feeling of word being spoken. Image of brown strap-handle.

Strength.—Sound of word and feeling of word being spoken. Image of a man lifting heavy weight.

Sweet.—Feeling of word being spoken and sound, thought of sugar.

TABLE XV.—SUBJECT C.

Reel.—Small yellowish reel of fine white cotton.

Cream.—Saw yellow cream at first alone, then basin developed, such as milk used to be put in when I was a child.

Loaf.—Part of loaf of bread (white). Feeling that there might be brown too if I looked long enough.

Style.—Nothing at all. Feeling of strangeness and helplessness.

Risk.—Nothing but the feeling that nothing was coming.

Soup.—No image. Nothing except eye sensations.

St. is interesting as showing only auditory images for words, while she has motor images for bodily movements generally.

S. In this case the verbal image is motor, the articulation of words and the suggestion is likewise articulated words.

H. has both auditory and motor imagery of words.

The suggestive force of the word is to call up an example illustrating the meaning, either as the image of a thing or as another word.

C. This subject found the experiments very difficult. No reference is made to the word.

(C) *Trustworthiness and Completeness.*—An important individual characteristic is the accuracy or inaccuracy of memory. There is often a difference between the Immediate and Mediate Memory of the same individual in this respect.

An individual, whose reproduction of data presented only a moment before is faulty, both in respect to clearness and completeness, may be one whose reproduction in Mediate Memory is trustworthy and full.

It would seem as if Jost's hypothesis, *re* "ageing" of associations,

were relevant in this connection, viz. that the memory is more mature after a certain interval than it is immediately after experience, and that this is the time at which repetition is most beneficial. On the other hand, there are individuals who can reproduce very accurately and fully at once, but whose memory is quite untrustworthy after the lapse of a short interval.

Experimental investigation of children's memory in comparison with that of adults contradicts the commonly accepted opinions on this point. On the whole, the memory of adults is far better than that of children. The adult can learn more quickly, reproduce more faithfully, and deal with a larger mass of material. What he cannot do, is retain as permanently. Unless he renews his experiences his memory will fade out more quickly than would the child's. To a certain extent this can be compensated for by his power of forming more far-reaching associations.

III. Improvement of Memory.—In children memory seems to improve with age from eight to fourteen or fifteen.

So many factors influence memory that it is difficult to say to what this improvement is due. The child acquires a greater power of concentrating attention, more material wherewith to form associations, experience teaches him what is likely, and what unlikely, to happen, and he become less liable to fill out his memory gaps with fiction.

Much has been said on the subject of memory training. I can only just touch on this point. Memory technique usually consists in aiding association by building up artificial principles of connection: mnemonics. Mnemonics have their use. Often the principle of connection is striking, and appeals at once to the learner, *e.g.* what could be of greater appeal to the school boy or girl, who is thinking that there are far too many battles in the Wars of the Roses, than the tag, "All boys never will mind, etc." But memory training needs something more than mnemonics. I think it is possible, even in ordinary school work, to do something towards *training*, as well as *exercising*, the memory. The teacher can teach children to help themselves. They can be shown how to learn, how to notice what is important, how to build rational associations. It is worth while encouraging a child to try different ways of memorizing, to find out whether visual, auditory, or motor imagery will help him most. Above all, it is important to make him realize that "will." "Effort" will do more than anything else to aid memory. Take a thing in with the intention of being able to re-experience it, and you will find that you have helped yourself to success. But I am touching on matters which are better known to many of you than to me, and with this I will conclude my lecture.

THE TUBERCULOUS CHILD.

By JANE WALKER, M.D., Brux., L.R.C.P.I., L.R.C.S., Edin.

Medical Superintendent East Anglian and Maltings Farm Sanatoria, Nayland.

A Paper read at Conference of the Child-Study Society, held in the University of London, Friday, May 10, 1912.

The importance of tuberculosis in childhood has been gradually growing in intensity. As far as pulmonary tuberculosis was concerned, opinion has, till quite recently, been in favour of its great rarity, and, as far as the disease is confined to those manifestations which we see in adults, viz. the hacking cough, wasting, profuse expectoration, hæmoptysis, together with the physical signs of cavities, and breaking-down lung, we should all be agreed that it is extremely rare in childhood. And we should all be agreed, too, that when it does occur in such a manner, it is a disease of great gravity. Taking a rough estimate of the cases of pulmonary tuberculosis in children under my charge during the last ten years, the mortality cannot have been less than 20 per cent.; it may, indeed, have been as great as 39 per cent., according to whether the cases lost sight of are considered to be living or dead.

But setting aside these rare cases of such extreme severity, it is becoming more and more evident that we have to deal with a considerable amount of tuberculosis in young children, and it may be that a large part of the tubercle in adults is contracted during early years of life. Indeed, from the frequency with which signs of healed tubercle are found post mortem in children who have died from something else, we must assume that this is so. Hence it follows that in any comprehensive scheme for dealing with tuberculosis, the question of its incidence in childhood must be one of the very first and foremost considerations. The signs and symptoms of the disease are often very vague in childhood, and may all be attributed to other causes. Such are loss of energy and strength; the child tires readily even with ordinary occupations, and without additional exertions; it is pale, anæmic, short of breath; it has no appetite. It is sick, has a little fever, some sweating at night, cough or pain in the chest or side. But all these symptoms may be due to other causes, and certainly considered separately, cannot point definitely to phthisis. For example, a child is tired and languid and inattentive, this may be entirely due to its home circumstances. I remember a marked instance of this occurring in a child in one of the Edinburgh schools. She was weary, inattentive, listless, and often came

late to school; in her case a drunken father compelled her to sit up till he came home when the public houses closed. Then digestive disturbances may be the cause of the ill-health, and, in its turn, it may be the result of bad and insufficient and unsuitable food given at unsuitable times, *e.g.* late at night. Loss of weight, to be a symptom worthy of note, must be progressive, and must be well marked. Persistent fever, lasting over some weeks, even if no other symptoms are obvious, is always suggestive of tubercle. Cough is not to be made much of, as it may occur in so many other conditions. But the fact is such slight infections do occur, and they heal, and, therefore, it may be that many cases of flagging health and debility in children are due to an unsuspected and unrecognized focus of tubercle somewhere. Such a focus may, of course, become quiescent, and give no farther trouble; it may, on the other hand, blaze out with fatal results. And the time, as we all know very well from our own experience, when this is most likely to take place is when the boys or girls are emerging into manhood or womanhood, and are taking up the work of life under harder circumstances, and when they are less sheltered and cared for than they were before. The mortality from phthisis is three times as great from fifteen to twenty years as it is from ten to fifteen. We are largely dependent for our knowledge as to the extent of tuberculosis in childhood on the reports of the School Medical Officers, whose appointment was made necessary by the enactment of the compulsory inspection of school children. What do we find? We find the greatest diversity of opinion amongst them. Indeed, the vexed question of the diagnosis of pulmonary tuberculosis is far from being solved, and the number of cases differs considerably in different localities. In Worcestershire, for instance, one of the Assistant Medical Officers diagnosed pulmonary tuberculosis in about 15 per cent. of the children examined; whereas, on the other hand, in Hertfordshire, out of a total of 12,772 children examined, one case of tuberculosis only was recorded. Taking two towns in the north of England, we find that the number of cases in Bradford is 42, out of a total of 7091, *i.e.* of every 1000 children examined in Bradford, fewer than 6 have been returned as consumptive; whereas at Barnsley, out of 3356, 63 children are returned, or nearly 19 out of every 1000 children examined, so that Barnsley appears to have more than three times as much tuberculosis amongst its children as has Bradford. When some say it is rare, and others (and those of wide experience and whose opinion has great weight) give 30 per cent. as the *probable* incidence of pulmonary manifestation, it is unwise, at the present moment, to make any very definite pronouncement as to the numbers of cases of tuberculosis in childhood with which we may find ourselves confronted.

The diagnosis of early pulmonary tuberculosis is extremely difficult even in adults, and in the hands of medical practitioners of the widest experience, and of most skilful powers of detection of disease. Dr. Walther, of Nordrach, used to say that nothing but time would tell how a sufferer from phthisis was going to do; and, just in the same way, it is time alone that can be depended on to tell us whether we have been correct or not in diagnosing pulmonary tuberculosis in a child.

Under this head, may I impress on my hearers the extreme importance of the plan suggested and carried out by the Board of Education, viz. the following up cases for years? Cases of vague illness in grown-up persons, as well as in children, are often due to some small focus of tubercle which may be quite incapable of positive detection. At the risk of being charged with a desire to introduce King Charles's head into the discussion, I must reiterate my conviction of the absurdity of present-day medical education with regard to pulmonary tuberculosis. Considering how many deaths from this disease occur during the year, and that it is by far the most important disease to which flesh is heir at the present era and in this country, it is much to be deplored that cases of pulmonary phthisis are not taken into our general hospitals where medical schools are attached. It is true that occasional cases are found in the wards, but they are of the kind that need no skill to diagnose, for they have their disease written large all over them, and could be recognized with certainty if they were passed in the street by the merest tyro in observation. That sort of case is largely past help, and its presence helps to fan the flame of pessimism so largely prevalent *still* in the medical profession with regard to pulmonary phthisis. Medical schools ought to be obliged to make adequate provision for the training of their students in the detection of early cases of phthisis. They should be made to weigh the value of this symptom and that in the diagnosis. They should be encouraged to make a tentative, and not a positive diagnosis, and to keep an eye on the case for a long period of time. They should be induced to see that a disease of such protean variety and such wide excursions—now mending, now going back a little, now making a great leap forward towards absolute recovery, and now getting a set back—all of which, to the trained observer, can be reckoned on, regulated, and accounted for to a nicety; that such a disease is of the deepest interest, and that it denotes a lack of scientific intelligence to pass it by on the other side as an incurable illness, and therefore of little importance.

One more thing on this head. Early diagnosis, and the consequent atmosphere of hope that it will bring about, is essential; we must also do away with that conspiracy of silence which has been the bane of

the treatment till lately. The utter folly of refusing to allow a patient suffering from phthisis to know what is the nature of his disease, when his active, earnest, and intelligent co-operation is an essential element in his cure, will be apparent to any one who has, even in a small degree, got beyond the idea of the disease being incurable. It has been well said, "No fool was ever cured of consumption"; but if you do not let him know what he is to do, how can he help being a fool?

This reference to improved medical education, thereby enabling medical practitioners to recognize cases of pulmonary tuberculosis early, brings me to the point of brief consideration of the National Insurance Act. Confining ourselves to the clauses concerned with "Sanatorium benefit," we have the skeleton of a complete scheme for dealing with the whole amount of tuberculosis of all kinds in the United Kingdom.

Under the Insurance Act, whereas the medical benefit, sick benefit, and maternity benefit only come into force at the end of six months, the sanatorium benefit comes into force when the Act comes into force, on July 15 next. In order that we might be, in a measure, prepared for this great change, a Committee for the Provision of Tuberculosis, on which I have the honour of serving, was appointed to draw up suggestions for a complete scheme, and the Interim Report of that Committee is now published. Although the special subject under consideration in this paper is the tuberculous child, it can only be properly considered as part of a general scheme. Clearly the first element in such a scheme is to know with what we have to deal, and, therefore, all cases of tuberculosis should be notified. As you all doubtless know, compulsory notification of pulmonary tuberculosis came into force on January 1, of this present year, and there is a fairly strong feeling that it should be made applicable to *all* forms of tuberculosis.

The second element in the scheme is the Tuberculosis Dispensary, or Institute. As many of you know, tuberculosis dispensaries have been established in many parts of London and elsewhere, under voluntary agencies, on what has now become well known as the Edinburgh plan. Except in purely administrative details the dispensaries about to be organized will be on the same lines as those hitherto in existence. There are now many municipal dispensaries where very much the same régime is pursued. The dispensary may be considered as the first line of defence, and as forming a kind of sorting, or clearing house. This is spoken of in the Interim Report *

* Interim Report of the Departmental Committee on Tuberculosis, 1912. Price 3*d*. [Cd. 6164.]

as the first unit, and it will either be directly controlled by the Medical Officer of Health and his assistants, or if it is provided voluntarily, it will be linked up with his department, and with the school medical services. It will also be intimately connected with the hospitals and general dispensaries in the district. It should be, in fact, a centre for the diagnosis and organization of the treatment of tuberculosis in the area in which it is situated. And as its work becomes better understood, it will be found that persons will come to it with slight symptoms, to find out whether they are suffering from tuberculosis or not. It is obvious how this will give an impetus to more accurate diagnosis and detection of early cases.

In its function as a clearing house, the tuberculosis dispensary will sort out the types of the disease, and draft them on to the various sections of the second unit, to which we shall refer later on, or keep them, if suitable, and treat them at the dispensary. Cases suitable to be treated at the dispensary will be those of patients whose illness is so slight that they can remain at home and follow their usual occupations, simply attending as out-patients, and having the treatment, whether by means of tuberculin or other special methods, appropriate for their condition.

There is another most important function of the dispensary, and that is to search out and examine "contacts." For this purpose, the home of a patient suffering from tuberculosis is visited, and all cases with whom he has been in contact are examined. The great value of this work is shown by the fact that no inquiry of this kind made by the existing dispensaries has been undertaken that has not resulted in the finding of disease in one or more contacts. In addition, the surroundings of the patient are noted, and if they are unsuitable, the attention of the proper authorities is drawn to it.

Another important function of the tuberculosis dispensary is that of after-care. All patients who have been under treatment for tuberculosis require a friendly eye on them from time to time. Indeed, the proper carrying out of this part of the scheme adds very considerably to the success of the treatment. By its means the spread of the disease will be checked, and there will be fewer cases of relapse than would otherwise occur. In the case of necessitous patients, it will be able to render timely help by food, by the provision of a sleeping shelter, and in some cases of sputum flasks and handkerchiefs, etc. It will do this by means of Voluntary Care Committees, the C.O.S., Guilds of Help, or any other agencies in its neighbourhood.

From the scientific point of view, the records kept at the dispensary will be of increasing value in determining the prevalence of the disease in its particular district, and also the results of special forms of treatment.

For the purpose of dealing with children, the dispensary must be regarded as a school inspection clinic (in some cases the children may have to be sent on to a regular school clinic), from which the children would be referred to a hospital, sanatorium, sanatorium school, residential tuberculosis school, or a special day-school.

It is of the highest importance to undertake the systematic treatment of tuberculous children. Children afford the best opportunity of detecting and dealing with the disease in its earliest stages, and the more the resisting power of the children is increased, the less will be the burden of disease on the next generation.

The same adverse circumstances that bring about tuberculosis in adults, bring it about in children; such as bad housing, want of fresh air, and insufficient food; this last factor seems, however, to be even more of a determining cause in the product of the disease in children than in adults.

In the complete scheme for dealing with tuberculosis, both in the insured and the non-insured person, the dispensary, or first unit, regarded for the moment as a clearing-house pure and simple, leads on naturally to the second unit, with its various divisions. First, the sanatorium for early cases. These cases will have to be selected with considerable care, and it is to be hoped that the larger number of them will return to the community as economically efficient persons. Each sanatorium ought to have enough land to allow of graduated labour being carried out, and therefore the second division of the second unit may be called the Farm Colony, which may be carried on as a separate institution; but, more properly, it comes into ordinary sanatorium treatment when a certain number of selected patients are retained as working patients, either permanently, or till they are sufficiently restored to health to return to their ordinary occupations. Let me say here, in passing, that in practically all cases patients should return to the work they are most accustomed to, especially if they are over twenty-two or twenty-three. They know it, they do it most easily, and, generally speaking, they make most money at it, all very important items in dealing with such a disease as consumption, where anxiety and diminished earning capacity play so large a part.

Then there is the third division, the home for advanced cases, where patients can go either for a prolonged period, or for the rest of their lives. It must not be forgotten that the advanced case is not necessarily the fatal case, only these cases take much longer to recover, and their chance of regaining economic efficiency becomes increasingly less.

Pulmonary tuberculosis is a local expression of a general disease,

and it is not unfrequently found that a patient with a large and extensive lesion is more highly efficient from an economic point of view than one with a very limited lung affection, but with profound general disturbance. So that the difficulties of predicting the future of a case on physical signs of disease in the lungs alone are very considerable, and only experience will enable us to estimate the chances of recovery in any given case.

These various divisions will all be required in any complete scheme for dealing with tuberculosis, but the two *chief* things to bear in mind are—

The Dispensary as first line of defence, and

The Sanatorium as the second.

So much for the general question. To return to tuberculous children, our energies must be directed to the home, school, or sanatorium treatment, remembering always (to quote from Dr. Newsholme's "Prevention of Tuberculosis") that tuberculous infection in children is nearly all domestic, and not scholastic, in origin, and therefore the home surroundings should be thoroughly investigated.

For purposes of treatment, cases of tuberculosis in children may be divided into—

1. Non-pulmonary, or surgical.
2. Pulmonary, or medical.

Non-pulmonary. The most important elements in this group are diseases of spine and bones and joints, but it also includes glandular swellings. These diseases account for about half the crippled children in the London schools, and it is an interesting fact, noticed both in America and this country, that the disease begins before the school age, *i.e.* during the first six years of life. This observation confirms the view of the home being most at fault in such cases, and it also accounts for the severity of the deformities, for the early symptoms of diseases of bones and joints are vague, and not marked by pain. The child may be simply awkward, or limping, or may sit down on the floor instead of stooping to pick up its toys, all of which seem trivial signs to an unexperienced onlooker.

It is quite evident that such children cannot be retained in an ordinary school. Up to within quite recent years, the plan has been to send the child to a hospital during the acute stage, and then, as soon as that stage was passed, to send it home either to attend as an out-patient, or to receive some sort of treatment at home. This has been the best obtainable for the larger number of cases up to quite recent times. It is obviously highly unsatisfactory, and it accounts for a very large proportion of crippling deformities, materially increasing

the length of treatment. Indeed, the time that must of necessity be occupied in the treatment of these children is the prime difficulty if they are not to be deformed, and if they are to grow up in any degree economically efficient. The best method of applying surgical treatment in children is undoubtedly under sanatorium conditions, where treatment and education can be carried on at the same time, and a suitable occupation or trade taught whereby the patient may earn his living when the time comes for him to do so. The hospital at Alton, founded by Sir W. Treloar, fulfils all these conditions, except that it has no arrangements for teaching girls a trade, and it may justly claim to be considered a model institution, which other institutions to be subsequently organized should copy. For it fully meets the needs of those afflicted with surgical tuberculosis. It is situated in a district where tuberculosis is uncommon, and it is so placed, on a southern slope, that patients get the maximum of sun and air, without undue exposure to wind. Moreover it is large, and is capable of expansion, and an institution where the very highest specialized training and skill is an essential, the numbers should be large enough to make it possible to have the best medical superintendent obtainable. Such an institution, too, must be large so as to reduce the cost of administration and maintenance. For the treatment to be efficacious and to be carried out in the best possible way, costly appliances are necessary, such as up-to-date X-ray apparatus, and if these things are to be in a number of small institutions, instead of in a few large ones, the cost of each place will be increased, and the efficiency correspondingly diminished.

Alton possesses an excellent X-ray department which is continually used, and without which a great deal of the best work done there would be impossible. It also has another essential, a plaster room where casts of the limbs are taken, upon which the beautiful celluloid splints, with which so many of the patients go out, are fitted, and where the affected limbs are set up in plaster. (Out of 190 children discharged last year, 141 left with splints or spinal jackets.)

The food is an abundant supply of the ordinary plain kind, and the strictest attention to economy is exercised in this, as, indeed, in all other details of the management.

Alton is also a special training school for nurses, and young nurses from eighteen, who have had no previous training, are desired. They stay for three years, and receive a certificate of three years' training, and they are uncommonly well taught by both matron and medical superintendent. One plan followed at Alton, and at no other place, is that the nurses undertake the duties of the teachers, and all children able to do so receive regular instruction. Another very interesting

department of Alton is "The College." There crippled lads from fourteen to eighteen are received for technical training in an occupation suited to their limitations, for a period of three years, and they are so well taught, that on discharge they are able to take up remunerative and self-supporting occupations. The staple industry in the College at Alton is the making of leather goods of all kinds, from quite small articles, such as blotters, little dispatch cases, to large leather trunks.

An indispensable element in the treatment of these children, as, indeed, of all sufferers from tuberculosis, whether pulmonary or non-pulmonary, whether in adults or children, is efficient and prolonged *after-care.* The system on which this is carried out at Alton is excellent. When a patient is discharged, a written paper of directions is given to the parent, or guardian, to whom its meaning is carefully explained. It is minute and particular, and nothing is left to chance, or to the parents' imagination. To enable the medical superintendent to see that his directions are being carried out, all London patients are required to be brought to the Out Patients' Department in London once in three months.

Among other institutions where such cases can be treated are Swinton House, Manchester, where the treatment and general management are excellent, but where the situation is not nearly so ideal; and the Royal Liverpool County Hospital for Children, at Heswall, and in this connection I cannot do better than quote some remarks of the Medical Officer to Heswall for 1910:—

"Two years have now passed since we moved into our buildings at Heswall, and since the foundation of the hospital in 1899 we have practically passed through three phases of experience. In the first years of our work the children were kept in closed wards, excepting during the warm months of the year, when they were often outside for part of each day. Then came our first year at Heswall, when with the expenditure of much labour, the patients, beds and all, were moved out in the early morning, and, weather permitting, were left out until the evening. Latterly, some of our open-air wards were completed, and during the greater part of 1910 treatment has been carried out entirely in the open air in the cases of all the children, except a few who require to be kept indoors during very severe weather. These experiences have taught us that, while treatment in closed wards produced results superior to those attained in the town hospitals, those results were a long way behind what were attained when the children were out all day and slept in at night; while the third phase, when the children were treated altogether in the open-air wards, produced results incomparably the best. The economic advantages of purely open-air

treatment are manifested by the fact that the period of treatment in all cases is greatly shortened."

Very considerable provision for London children chargeable to the Guardians of the poor suffering from various forms of tuberculous disease has been made in recent years by the Metropolitan Asylums Board. The institutions under the control of this authority at which these cases are received are—

East Cliff House, Margate (130 beds), which is adapted for open-air treatment, and reserved almost entirely for cases of surgical tuberculosis, has been under the control of the Board since 1898. 3595 cases have been treated there, and many remarkable successful results have been achieved.

The Millfield Sanatorium (120 beds), on the coast at Rustington, near Littlehampton, was provided with verandahs and a sun-room, as proposed by the late Sir William Broadbent. This sanatorium is reserved for diseases of the lungs, and 821 children have been under treatment since its opening in 1904.

Queen Mary's Hospital for Children, Carshalton, Surrey (850 beds), open 1909, is a modern hospital on the bungalow system, and is well-equipped with verandahs. Since the opening, some 5311 poor children have been under treatment, and it is estimated that about 20 per cent. of them have suffered from tubercular disease.

A few cases have also been received at the Park Hospital for Children (800 beds), Hither Green, Lewisham, S.E.

No ordinary general, or children's hospital, however good, nor any ordinary convalescent home is comparable with such an institution as Alton. The former cannot keep their patients long enough, the latter have, in the majority of cases, neither suitable equipment nor staff.

We find that taking the second and most difficult section, viz. medical tuberculosis, the bulk of this is pulmonary, and if the disease is really pronounced and definite, the best method of treatment is at a residential sanatorium. The following are the institutions at present established:—

1. Kindercot Children's Sanatorium School, at Peppard, near Reading. This is a separate department of Maitland Sanatorium, and is intended for children with early pulmonary tuberculosis, with a view to enable their education to be carried out under the best possible conditions, instead of being stopped, as is so often the case. It provides accommodation for about 20 children, and is under the direction of the Resident Medical Superintendent, Dr. Esther Carling, and there is a resident matron and a schoolmistress. As far as possible, fairly regular school hours are kept, and the instruction given is modern and up to

date. The children also do light house-work. The cost is about £1 a week.

2. The Children's Sanatorium, at Holt, which has been in existence for about eight years in temporary premises. A new building is in course of erection, and it will be opened some time during this summer. It will accommodate 40 children. Cases are sent mainly through the Invalid Children's Aid Association, Poor Law Guardians, and other bodies. Girls may remain up to sixteen, but boys only to seven years of age. The weekly cost is about 27*s.*

3. Stannington Sanatorium for Children, Northumberland. It can accommodate 100 children, 50 of pulmonary, and 50, on the other side, of surgical cases. There are at present no arrangements for giving instruction to the children, but it is hoped before long to do so. Such provision would greatly add to the value of an institution of this kind.

5. Gateforth Children's Sanatorium School, in connection with the Sanatorium at Gateforth for the city of Leeds, accommodates 20 children.

6. Royal Victoria Hospital for Consumption, Edinburgh, although for adults, admits a few children, and in addition about 12 children spend their days there from 8 a.m. to 7 p.m.

7. The Manchester Education Authority has established a residential Sanatorium School at Summerseal House, for early cases. Here 40 children can be taken.

8. Sanatorium at Harpenden, a department of Dr. Stevenson's Homes, an excellent building, and an institution doing very good work, which has 50 beds. It has hardly completed one year of working.

9. Dr. Barnardo's Sanatorium at Barkingside, Essex.

There are also the following day schools:—

1. Kensal House, established in connection with the Paddington Tuberculosis Dispensary.

2. The Whitley Open-air School for Phthisical Children, near Reading.

3. The Barnsley Open-air School.

The cost of sanatorium treatment for children is comparatively high, from 15*s.* to 20*s.* per week, hence as many as can be should be treated in ordinary schools, modified as open-air schools. In planning such a school, it should be remembered that the home surroundings are generally as unfavourable as can be, and that the less time spent there the better. So the curriculum must necessarily extend over a much larger portion of the day than does that of an ordinary school. It should begin early in the morning, and go on to late in the day, and must include feeding and opportunity for resting. There should be a

nurse in attendance, and careful medical supervision, for many of these children will have signs of active disease, and their work and rest and exercises must be arranged accordingly. Of course as much attention as can be must be paid to the home surroundings, for, as we have seen, it is there, and not at the school, that the seeds of the disease are sown.

In conclusion, I should like to say a few special words about the treatment of children in a sanatorium. Whatever arguments may be brought against sanatoria for grown-up people, they have very little, if any, weight when we come to think of the subject from the children's point of view. Let us consider a few of the objections.

People say, "Oh, I should not like to go to a sanatorium; it is so depressing. I cannot bear to see people who are ill, and I should be so miserable if I knew they were not going to get better." Children are not depressed by illness; they may be annoyed by it if it prevents them making as much noise as they wish; but, in truth, they are more often amused and interested. (Please understand that I am not endorsing the view that a sanatorium is a depressing place; it is one of the most cheerful and cheering places in existence.)

Then another objection is that it encourages loafing, that sanatorium patients lose the habit of work. That is an old story, and we have changed all that; but whatever modicum of truth may lie in it for grown-up people, there is not one atom as regards children. *The* difficulty with children is to keep them from doing too much, as any one knows who has had the privilege of looking after them when they are ill; and this necessary discipline of learning to keep quiet and still is far better taught in a community where every one is doing the same thing than at home, where the temptation to do what the others are doing is almost too great to be resisted.

Then, as we have seen, a certain amount of education and instruction can go on *pari passu* with the treatment; and if children who have had to have sanatorium treatment are not to be hampered mentally as well as possibly physically, a skilled teacher is essential in every children's sanatorium. One who has herself, or himself, been through the training ground of the sanatorium and the discipline of the illness is in many ways an advantage. There are, unfortunately, many such, and to employ one in this way confers a double blessing.

Then, lastly, there is the subject of food, generally in my experience the final objection. Patients can stand everything else, *but* "I could *not* eat such quantities of food. I have such a small appetite. I will do my best, but——" and so on. Now, we know well the wearisome, heartbreaking sight of a child that does not care a straw for its food,

that just plays with it, interested in everything rather than that: such a child will cheerfully take one or two hours over its dinner; but such a procedure is absolutely disorganizing to any ordinary household. The other children have eaten their food, and have gone to their various occupations, and, at the best, the little frail one is left by itself. Usually its plate is taken away almost untouched, and it is abused for being such a naughty child, and for being so tiresome over its food. In a sanatorium, the slow eater, with no appetite, is no stranger; they are nearly all alike, and what one is doing, the rest are mostly doing too. It matters not how long he is over his meals; there is no hurry, and, as it is the main business of the day, at recurring intervals, he gradually falls into his place, and meals become less of a task, and more of a pleasure.

This great problem extends beyond the child and the school; it is a national question, and whatever tends to solve it, forms an important step in the maintaining of that efficiency which enables us to keep our place amongst the foremost nations of the world.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Sensory Training.—"Which is of first importance to the child—the receiving of information or the development of the psychophysical organism? Most statements of educational aims emphasize the latter, but the prevailing practice is based upon the former alternative. Why? It is so easy; those who do not know how to teach are often natural experts in imparting information. It is so satisfying; the lecturer, from the kindergarten teacher to the university professor, can cast the statement of fact in such a lucid and artistic form that he is set all aglow with self-appreciation. The pupils approve of it; the ready-made goods seem attractive, and it is so comfortable to be free from effort and have things done for one. . . ."

By sensory training and the consequent establishment of "right habits of attention, the efficient keenness of the senses may be increased manifold above the now-prevailing average; that these habits, once established, tend to perpetuate themselves and are an inestimable asset of power; that as a result of high efficiency in the power of sensory acquisition the information which is vital to life will come by the way; and that keen perception, the foundation of intelligence, is a condition for true and vital imagery, faithful memory, clear perception, incisive reasoning, and efficient action."—*Dr. C. E. Seashore*, in the *Journal of Educational Psychology* (U.S.A.).

Teaching the Domestic Arts.—"Is science, as the exposition of truth in due order of development, to be used for the purpose of

secondary education; or shall the activity of girls in the laboratory be regulated by inquiry into important and interesting problems arising out of desire to penetrate to the mysteries of diet, cooking, washing, and household cleaning? . . . The main body of opinion among the science teachers [is] that science, as such, *i.e.* in connected sequence, should be studied by all who, with the time and opportunity of secondary education, are capable of understanding it. . . . It is maintained that science cannot be taught with that clearness as to the issues involved and their relations which the average mind requires, if it be taught in the form of a commentary on the complex body of the domestic arts. . . . The best solution is, I believe, the German solution, that the girl should, at the end of the ordinary school-course, take another year either in a special school—the German method—or at the top of the secondary school, as some of us try to solve the problem here."—*Mrs. Bryant, D.Sc., Lit.D.*, on "Science and the Home Arts," *Educational Times*, December, 1912.

Parental Pedagogy.—"The upbringing of children is a very serious matter and upon its successful issue largely depends the future of the race. Unfortunately parenthood is accepted in a very haphazard manner. Indeed, the average individual makes very little better preparation for the offspring than do the lower animals, though they deal with the training of an intelligence. We require a new science, the study of parentage; something between the sublety of psychology and the steely precision of the eugenics of Professor Carl Pearson. Some day, parental pedagogy will be part of the curriculum in schools."—*A. H. Gerrard, M.D.*, on "Infancy, Childhood, and Adolescence," in *The Parents' Review*, October, 1912.

NOTES.

Our Journal.—After very careful and anxious consideration by the Journal Committee, and a reference of the matter to each branch, it has been decided to make certain alterations with regard to the publication of our journal. These changes have been approved by a decisive majority of the branches, and by a very large majority so far as the actual subscribers are represented. In future the journal will appear eight times a year, that is, each month excepting January, July, August, and September. It will be seen that the months omitted are those during which most of the subscribers will be taking their holidays.

The familiar, and we hope welcome, outward appearance (cover) will remain unaltered, but there will be some changes—not finally settled yet—in the internal arrangements. The price is to be reduced to threepence per issue, so that the annual subscription remains the same, and it is hoped that the postage will not be more than a halfpenny, and hence the total cost will be unchanged. Each number will, of course, have somewhat less in contents—at least for the present—than formerly, but the total amount of matter during the year will be very much greater than hitherto.

The chief advantages which will arise from the changes will be: the members will

have the opportunity of getting a larger number of the valuable and important papers read at our meetings ; the papers will be published immediately or not long after they are given, and before other journals have already published them ; meetings and current events can be dealt with in time to be of much greater use to the readers ; it will be possible to introduce additional features, and, generally, the journal will be in many ways more valuable and useful to the subscribers, and more worthy of the society.

The new order of things will come into force in February. The Journal Committee feel confident that they can continue to rely upon the loyalty, goodwill, and generous assistance of the honorary secretaries of the branches, upon whom much depends ; and they also ask individual members to do all they can to increase the sale of the journal by introducing it to their friends, and getting booksellers, etc., to show it.

The Welfare of Infancy.—A new society called *The National Association for the Prevention of Infant Mortality and for the Welfare of Infancy* has recently been formed by an alliance between the National Conferences on Infant Mortality, the National League for Physical Education and Improvement, the Association of Infant Consultations and Schools for Mothers, and the Women's National Health Association of Ireland. Mr. John Burns is the president of the association, and Sir Thomas Barlow the chairman of the executive committee. The new society has already arranged to hold a post-graduate course on the feeding and care of infants, in London from January 6th to the 16th. It is also engaged in organizing an English-speaking Conference on Infant Mortality, to be held in London on August 4th and 5th next, a date which immediately precedes the International Medical Conference. In addition to expert authorities in England, delegates from overseas dominions and America will take part in this conference. The secretary of the association is Miss Halford, 5, Tavistock Square, London, W.C.

"Education."—We are asked to announce that this weekly journal will in future be sold at a penny per week instead of threepence ; or post free for a year 6*s.* 6*d.* There will be no reduction in the size of the paper. The price has been reduced to meet the views of teachers and others who cannot afford a threepenny paper.

Our Next Conference.—As mentioned in our last number, this is to be held at Liverpool on May 22, 23, and 24. The subject is "Child-Study as a Link between the Home and the School." We are glad to be able to announce that Mrs. Mumford, Professor Campagnac, and Dr. Leslie M'Kenzie have promised to read papers.

Our President.—At the unanimous request of the Council Sir James Crichton-Browne has again consented to honour us by being our president for another year. He will give the annual presidential address at the Liverpool conference.

Our Library.—Mr. Macleod Yearsley, F.R.C.S., has presented the following books to the library : *The Child's Mind*, W. E. Urwick ; *An Introduction to Child Study*, Dr. W. B. Drummond ; *The Health of the School Child*, Dr. W. L. Mackenzie ; *Adenoids, Cases of Acquired Deaf-Mutism due to Congenital Syphilis, The Treatment of Ears in School Children, The Education of the Deaf, The Causes leading to Educational Deafness, The Prevention of Deafness, An Investigation into the Occurrence of Adenoids, The Classification of Deaf Children*, M. Yearsley ; and *The Criminal Mind*, Dr. M. de Fleury. "W. Sharman" has presented *Organization at Hazlewood School.* Dr. G. E. Shuttleworth has presented *Mentally Deficient Children.*

London Society's Lectures.—The first lecture next year will be given by Dr. James Kerr, M.A., on February 13 : subject *Brain Mechanism and Handwriting.* The second will be by Dr. A. Wilson, on February 27 : subject *The Development of the Child's Brain.*

CORRESPONDENCE.—Sexual Hygiene.

Sir,—Having read Dr. Pritchard's admirable paper on the teaching of Sexual Hygiene, may I offer the following remarks from my own practical experience? First, although I have four sons of my own and teach them myself, Dr. Pritchard is perfectly right in saying that, as a rule, parents are not the best people to teach these matters to their own children. They are too self-conscious or too sentimental, their own attitude to the subject is not natural. This is indeed the whole difficulty—the absence of a natural attitude in those who teach; but I disagree completely with Dr. Pritchard when he says "there does not seem any pressing hurry to reach the lower levels of childhood." It is exactly in the lower levels of childhood that a natural attitude must have its foundation laid. You must begin at 3 years old, to secure a natural attitude by means of the child's interest in the bees and flowers and the work of the pollen, and by means of perfect frankness in face of the child's close reasoning and analogy from this onwards. Reverence for life and all its processes is your only chance of securing self-reverence later. The sexual purity of the Irish can be easily explained by the very natural attitude of the Irish mothers, this again points to the importance of the lower levels of childhood. Mothers may not be able to give lessons on sex hygiene, but we never must forget "that education is an atmosphere." On that atmosphere depends the creation of the natural attitude on which alone purity can be safely based. That atmosphere can only be created by wise motherhood or by that wonderful system of Dr. Maria Montessori, which gives the lens of science to the eyes of motherhood, and allows the motherhood so aided to cover the homeless little ones of slums and cities. But she must reach the lower levels of childhood, and insist on gathering the little ones from 4 to 7 years old.

T. L. Frere.

REVIEWS.

The Sexual Life of the Child. By Albert Moll, M.D., translated by Dr. Eden Paul. George Allen & Co.

The work of Von Krafft-Ebing on the psychopathics of sex combined with the writings of Havelock Ellis on its sociological and philosophical aspects has done more to rescue the whole problem of sex from its position of unmerited obscurity and suspicion than the efforts of all other authors combined. Some few years ago Professor Freud, of Vienna, startled an unprepared world by his claim that many of the hysterical and neurotic manifestations of later life, in both men and women, found their explanation in some of the little understood sexual incidents of early childhood. Although Professor Freud's views have not found general acceptance, thanks to his courage and to his great powers of exposition, the whole subject of the sexual life of the child has been submitted to the closest investigation, and the fact of its predominating influence has been amply confirmed. No man has studied the aspects of the sexual life of the child more thoroughly than Professor Moll, and he has incorporated his experiences in a book of some magnitude. This work has been translated into English, and most excellently translated, by Dr. Eden Paul, and it is now offered to the notice of members of the medical, scholastic, legal, and clerical professions, to whom alone the publishers have determined to sell it. We believe this book will subserve a very useful *rôle*, for we can conceive of no knowledge with respect to childhood that can be of greater importance than the kind of knowledge which is inscribed on every page of this work. Von Krafft-Ebing's views were too pathological, Freud's teaching is too psychological, and Havelock Ellis's too general for particular application. Moll seems to have struck a happy mean, and to have written as much down

to the level of the unscientific pedagogue, as he has written up to the level of the psychologist with pedagogic interests. Moll's chief method has been the investigation of the normal, he has kept normal children under observation, and has taken the personal records of a large number of normal adult individuals. Most grown persons can recollect some striking sexual incident which made a strong impression on the processes of mind at a time when the sexual instinct was still undifferentiated. Moll has taken a number of such records from various sources and has pieced them together in such a way as to make a fairly intelligible whole. Making full allowance for the inaccuracies of memory, and the want of proportion which this method of anamnesis encourages, it is clear that this line of inquiry, when checked and supplemented by the method of direct observation, affords most valuable information of the heretofore little suspected existence of the child's sexual life. Each method of inquiry has its defects, for by the time children have become conscious, no matter how imperfectly, of the existence of this great motive force, and have acquired a sufficient command of language to express their subjective feelings, they are usually so overcome with bashfulness and false shame that they are entirely uncommunicative—and long before this time they are very quick to detect any close scrutiny of their actions. Both the physician and the educationist have countless opportunities for observing the strange manner in which the subjective erotism of children is manifested in their outward behaviour, but it is necessary first to know for what to look, and necessary, in the second place, to interpret correctly that which is observed, for it is very easy to exaggerate the importance of such manifestation, and very easy to misinterpret their significance. If Moll's investigation prove nothing else, they certainly prove that the normal child is strongly actuated by sexual impulses which at first are quite undifferentiated and often incestuous. The importance of these instincts can scarcely be exaggerated from the medico-legal point of view. Sexual perversion and sexual precocities are often due to a misunderstanding or to a misdirection of these early manifestations of the sexual instinct. There can be no doubt that many a tragedy might have been avoided in the past had the various phases of the sexual life in children been better understood. Now that Professor Moll has lifted the veil from a side of life which has been too much neglected, it can be only hoped that in the methods of the nursery and of the school full advantage will be taken of that knowledge which is so clearly set forth in the pages of this invaluable work.

The Elements of Child-Protection. By Dr. SIGMUND ENGEL, translated by Dr. EDEN PAUL. George Allen & Co. Pp. 276. 15*s.* net.

In his preface the author says: "This book is an investigation of all the problems involved by child-protection from the standpoints of the modern socialist movement and of modern social science. . . . My aim has rather been to effect a lucid presentation of all the problems of child-protection, than to attempt myself to supply the solution of all these problems." The contents cover these topics: *General Part:* some problems of population; child mortality; quality of population—artificial selection (eugenics) and education; pros and cons of child-protection; executive instruments thereof. *Department of Civil Law and Individual Rights:* marriage and parental authority; marriage and heredity; protection of illegitimate children; limited powers of minors, and guardianship. *Department of Local Administrative Activity:* child-protection as to birth; infant-life protection; care of foundlings, wet-nursing, and baby-farming; women's labour and child-labour; protection of children against disease; the public elementary school. *Department of Criminal Law:* criminality in youth; penal methods; prostitution; punishable offences against children.

It will be seen that a very wide area is covered. As far as we can judge, this has been very ably and helpfully done. Parents, teachers, and social workers, who wish

to get a grasp of the general social relations of the child, will find competent and comprehensive guidance here.

Citizens in the Making. By F. J. BILLIARDE, B.A., Superintendent of Neglected Children, Province of Manitoba. Pp. 148.

This is the superintendents' annual report for 1912, and is officially addressed to the Hon. J. H. Howden, K.C., Attorney-General, Manitoba, while publicly addressed to "social workers, probation officers, clergymen, civic officials, and others," who have made "so many inquiries" of the author. It deals with the detention home, truant school, children's hospital, fresh-air camp, juvenile court, probation, children's playground, slum child, causes of delinquency, etc. There is much that should prove interesting and suggestive to all who have to do with such matters. The writer is obviously a devoted enthusiast in his work, and his strong feelings lead him sometimes to indulge in sensational writing, and at other's cause him to break forth into verse. The section on "Children's Playgrounds" is especially good. The report is fully illustrated with excellent photographs.

The Diary of a Free Kindergarten. By LILEEN HARDY. Gay & Hancock, Ltd. Pp. 175. 3*s.* 6*d.* net.

Miss Hardy has written a charming diary account of a splendid piece of social and educational work in an Edinburgh slum. We envy her the many delightful experiences she has had, and the fine results of her efforts. The clergy, parents, and social workers may all learn much from this narrative, while all teachers of the young should find in it as much profit as delight. Here is a very suggestive statement of the aim of a Free Kindergarten: "The kindergartner's aim is not to give instruction, but to supply such appropriate environment, stimulus, and protection, that the child's inherent capacities, like a seed, will naturally unfold into harmonious development, into such a pure and perfect whole as a flower naturally becomes in the hands of a skilled gardener." The book is full of practical educational guidance on nearly every phase of infants' education on the most modern lines.

The book is full of the adventures, crises, and triumphs of the work; it has many naïve revelations of child and adult nature; and is, indeed, a real romance of educational life. The style is literary and unusually attractive—a pleasure to read. We wish it the success it deserves. Only one thing we should like to suggest to all teachers of infants who read this book: that they should study seriously and extensively the psychology of religion. Has it ever struck them that, without such study, they may be systematically preparing the little ones, to whom they so ungrudgingly and unsparingly devote themselves, for irreligion? Let them ask this of the psychology of religion.

The Life of Christ. By Rev. F. M. BLAKISTON, M.A. Pp. 370. 2*s.* 6*d.* net.

Builders of the Church and Prayer Book. By Miss K. L. M. ROWTON. Pp. 324. 2*s.* net.

The Church's Year in the Sunday Kindergarten. By SIBYL LONGMAN. Pp. 314. 2*s.* net. National Society's Depository.

The first of the above three books is a series of lessons for older scholars (14 years and upwards). It is on the old-fashioned, informational, and hortatory lines, and has but little to recommend it. The second book will prove helpful to any teacher who believes that an *olla-podrida* of history, ritual, religion, etc., is of real educational and spiritual value to boys and girls (aged from 11 to 14 years). The third book contains lessons for children from 5 to 8 years of age. These are modelled on what are known as New Methods for Sunday Schools, and will be both interesting and useful to teachers who are trying such methods. Such volumes as these make one sadly realize

how much there is to do in spreading a knowledge of child psychology, and the vital importance of the study of the psychology of religion by those who teach religion.

Teachers and Taught, a Monthly Magazine. Headley Brothers. Pp. 16. 1*d.* monthly, 1*s.* 6*d.* per ann., post free. Friends First-day School Association.

This claims to be "the only periodical devoted to the interests of Religious Education in this country that has six distinct grades of lessons; these, as will be seen, are planned to meet the requirements of the main natural divisions of childhood from infancy up to early adolescence." We must emphatically refuse to admit the latter part of this claim, for the lessons appear to us to violate all we know of child psychology. Infants of the "ages 4 and 5 years" have nothing to do with the "underlying thought—Those who love God help each other," as shown by "Elisha in Shunem"; nor are they ready to begin the study of "Fallen Leaves and Earthworms," etc. The lessons for "children aged 6, 7, and 8" are, in our opinion, equally mistaken and mischievous. The compilers show skill in the handling of reference books from the adult point of view, but—if we know anything of it—a lamentable lack of knowledge of child nature. The lessons "for ages 9, 10, 11, and 12" are much nearer to childish interests and understandings. As for those "for ages 13 and over," we should like to examine a class of adults to whom they had been given. We write these criticisms in sorrow that such good intentions should, as we think, lead to such bad practices. We earnestly commend to the consideration of the writers these words of Professor William James: "I think I have seen college students for ever unfitted for philosophy from having taken that subject up a year too soon" (*Talks to Teachers*).

Publications Received.—*The Journal of Education; The Educational Times; The Journal of Educational Psychology* (U.S.A.); *Educational Review* (U.S.A.); *L'Education Familiale; The Woman Teacher; The Woman Teacher's Magazine; Moral Education League Quarterly; The Training School; La Revue Psychologique; L'Année Pédagogique; The Parents' Review; La Escuela Cubana; Child Life; The National Temperance Quarterly.*

Pauline's First Reading Book, pp. 141, 1*s.* 6*d.*, Longmans; seventh annual report of *The National League for Physical Education and Improvement;* fourteenth annual report of *The Children's Committee, Metropolitan Asylums Board; The Diner's Out Vade-Mecum*, Alfred H. Miles, pp. 224, 1*s.* 6*d.* net, Stanley Paul & Co.; first annual report of *The National Bureau for Promoting the General Welfare of the Deaf;* third annual report of *The American School Peace League; The Life and Teaching of Jesus*, Gospel readings for Children, E. E. Read Mumford, M.A., pp. 160, 1*s.* 6*d.* net, Longmans; *A Short History of Todmorden*, Joshua Holden, M.A., pp. 242, 2*s.* net, Sherratt & Hughes; *Pictures and Illustrations for the Teacher*, National Society's Depository; sixteenth annual report of *National Association for the Feeble-Minded; The Everyday Savoury Book*, Marie Worth, pp. 120, 1*s.* net, Stanley Paul & Co.

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